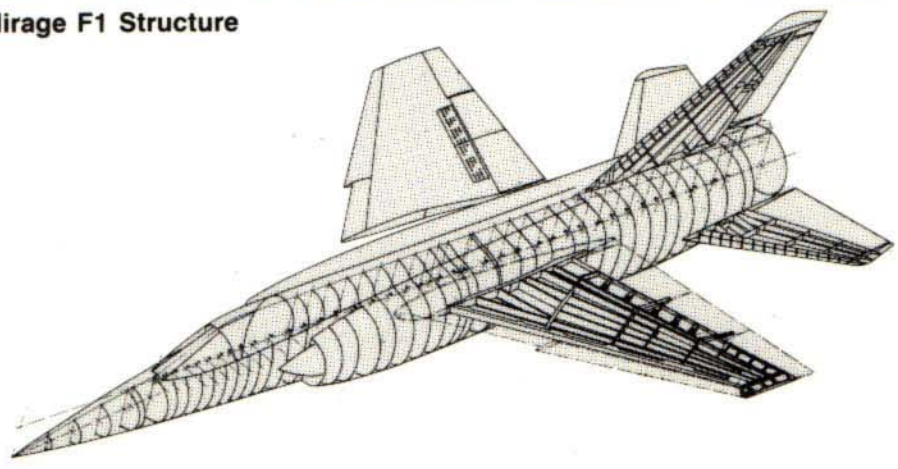
Aerofax Minigraph 17

Dassault Mirage F1

by René Francillon

Mirage F1 Structure



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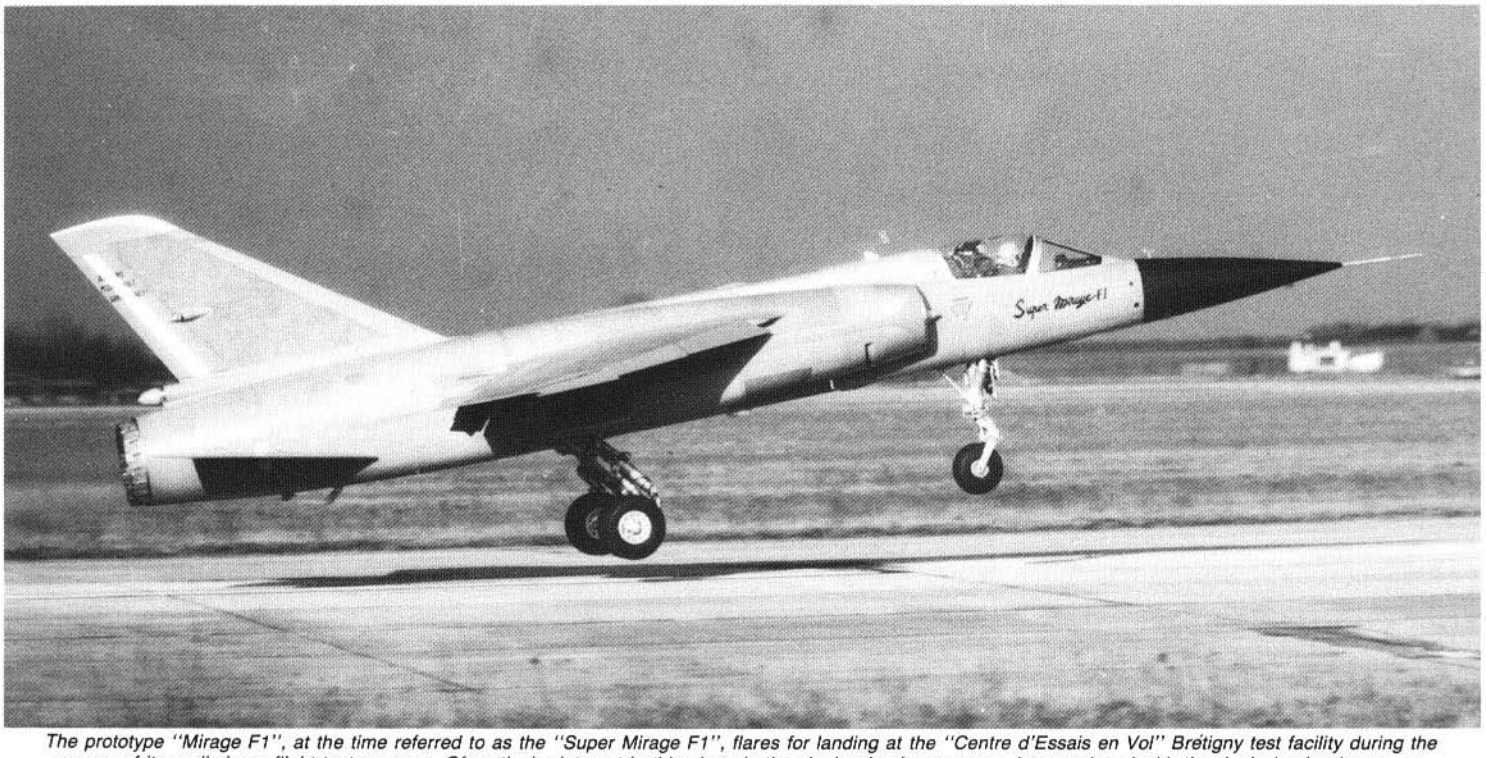
THE DASSAULT *MIRAGE F1* STORY

Dassault via René Francillon



The prototype "Mirage F1", at the time referred to as the "Super Mirage F1", flares for landing at the "Centre d'Essais en Vol" Brétigny test facility during the course of its preliminary flight test program. Of particular interest in this photo is the single-wheel nose gear—later replaced with the dual-wheel unit seen on all production "F1's". This aircraft was lost on May 19, 1967, while practicing an aerobatic routine for the Paris Airshow.

CREDITS:

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Nous tenons à exprimer notre très sincère reconnaissance pour l'aide qui nous a été fournie par les services de presse de l'AMD-BA, de la MATRA, de la SEMMB, et de la SNECMA, ainsi que par le SIRPA-AIR, le personnel de la B.A. 115 et de la 5ème Escadre, et nos amis et collègues francais.

PROGRAM HISTORY:

With the undeniable successes of the *Ouragan, Mystère IIC, Mystère IVA* and *Super Mystère B2* fighters on the domestic and export markets during the 1950's and 1960's, and the even greater achievement of the *Mirage III* supersonic fighter during the 1970's, Avions Marcel Dassault [1] became solidly established as France's leading post-WWII combat aircraft manufacturer. The *Mirage III*'s successes were, in fact, cause for the birth of a close working relationship between Dassault and the *Armée de l'Air* during the mid-1960's, this leading to the initiation of a study program calling for the eventual development of a *Mirage III* successor.

In Search of a Formula

Reflecting the high interest then being shown around the world in VTOL and variable geometry fighter designs during the early 1960's, the preliminary definition studies calling for a *Mirage III* replacement encompassed a broad range of configurations. The *Armée de l'Air*, unsure of its requirements for aircraft with either VTOL or variable geometry capability, encouraged the Dassault design team to proceed with the manufacture and test of several different prototype configurations.

To explore the practicality of VTOL fighters, Dassault modified the first *Mirage III* prototype (III-01) by widening its fuselage and replacing its SNECMA *Atar* 101 G-2 with a 4,850-lb. th. Bristol *Orpheus 3* for conventional flight and eight vertically-mounted 2,200-lb. th. Rolls-Royce RB.108's for vertical flight. Designated *Balzac V* 001, this aircraft made its first flight, in tethered condition, on October 12, 1962, and first flew conventionally on March 18, 1963. Eleven days later it effected its first true VTOL flight, transitioning from vertical to horizontal, and back again.

The *Balzac* was badly damaged on January 27, 1964 (a French AF test pilot losing his life in the accident), but the aircraft was quickly rebuilt for additional flight testing. A second crash while being flown by a U.S. test pilot on September 8, 1965, ended the program for good.

The evaluation of this prototype for a new generation of French combat aircraft was followed by that of the *Mirage IIIT* (first flown on June 4, 1964), the *Mirage IIIV* (the first of two prototypes flying on February 12, 1965), the *Mirage IIIF2* (June 12, 1966), the *Mirage IIIF1* (December 23, 1966), and the *Mirage IIIG* (November 18,

Dassault via Alain Pelletier

The "Mirage F1" production line at Dassault's Bordeaux plant was shared with a similar line for the "Super Etendard" carrier-based aircraft (background). Facilities do not appear to be as automated as contemporary U.S. facilities and there does not appear to be a true elevated production line process involved.

Dassault via Alain Pelletier

An early "Mirage F1" is seen in formation with two of its testbed predecessors, the "Mirage IIIF2" (center) and the "Mirage G1" (top). The former was essentially a large, two-seat aerodynamic prototype of the "F1", and the latter was a variable-geometry "Mirage" family testbed (seen here with wings swept at 70°).

1967). Even though these five types all used *Mirage III* as part of their designation and, indeed, shared design features inherited from the famous delta wing fighter (e.g., lateral air intakes with movable center-body half-cones), they differed greatly from their forebear and from each other.

The *Mirage IIIT* retained the tailless delta configuration of the standard *Mirage III* but had a center and rear fuselage of increased diameter to serve as an engine testbed. It was first powered by a 10,500-lb. thrust SNECMA TF-104 turbofan (a French derivative of the Pratt & Whitney JTF10A-4) without afterburner but was later re-engined with an 11,350-lb. th. dry/18,500-lb. th. afterburning TF-106 (a further derivative of the JTF10 turbofan).

Larger and heavier than the *Balzac V* but of similar tailless delta configuration, the two *Mirage IIIV's* were VTOL fighter prototypes. For conventional flight, the first prototype was powered by an 18,500-lb. th. afterburning TF-106 while the second used a 23,000-lb. th. afterburning TF-306 (Pratt & Whitney JTF10A-22); to achieve vertical take-off and landing, both relied on eight vertically-mounted 4,850-lb. th. Rolls-Royce RB.162-1 lift turbojets. However, with its multiplicity of engines, the *Mirage IIIV* would have been difficult to maintain under operational conditions. Moreover, it was expensive and its performance (particularly combat radius and climb rate) was markedly inferior to that of more conventional aircraft. Not surprisingly, the *Armée de l'Air* had, by now, lost interest in VTOL fighters and the *Mirage IIIV* was not developed beyond the experimental stage.

For many years, the prospect of a variable-geometry (swing wing) fighter appeared much better in France than that of VTOL aircraft. In 1964, Dassault initiated preliminary design studies for a twin-engine v-g fighter *(Project Daphné)* which, together with similar studies by British Aircraft Corporation, provided the basis for the AFVG (Anglo-French Variable-Geometry) aircraft. Intended to meet the needs of both the *Armée de l'Air* and the Royal Air Force, this project was covered by a Memorandum of Understanding signed in May, 1965, by the French and British governments. After two years, however, the AFVG project floundered due to political disagreement between the participating parties and, to a lesser extent, to the rivalry over design leadership between Dassault and BAC. The bi-national twin-engine AFVG was therefore cancelled and shortly thereafter the French government instructed Dassault to go ahead with the design of an indigenous single-engine aircraft.

Designated *Mirage IIIG* (later *Mirage G1*), this TF-306 powered prototype, with wings that could be swept from 23° to 70°, flew some 400 hours before crashing on January 13, 1971. By then, however, Dassault had almost completed the first prototype of a twin-engine version under the designation *Mirage G8*. Powered by two 15,870-lb. th. SNECMA *Atar 9K-50* turbojets it was one of the most powerful interceptors of its day. On July 13, 1973, the second *Mirage G8* flew at Mach 2.34 which remains the highest speed yet attained by a French aircraft. Though technically extremely successful, the *Mirage G8* was not placed in production as the immediate needs of the *Armée de l'Air* had by now been satisfied by the acquisition of *Mirage F1C* interceptors and SEPECAT *Jaguar* strike fighters. At that time it was anticipated that the *Armée de l'Air's* later requirements for an ACF (Avion de Combat Futur—Future Combat Aircraft) would be met by the less complex *Super Mirage*, a development of the *Mirage G8* with 55° sweep, fixed-geometry wings and two SNECMA M53 turbofans. However, the ACF proved too expensive to produce and it was the delta wing *Mirage 2000* which eventually surfaced as the present production fighter to fulfill *Armée de l'Air* needs.

While the highly complex *Mirage IIIV* and *Mirage IIIG/Mirage G* programs were being explored, Dassault and the *Armée de l'Air* agreed to proceed with the initial development of a less ambitious design, the *Mirage IIIF2* (later *Mirage F2*). Furthermore, on its own Dassault initiated an even less ambitious project, the *Mirage IIIF1* or *Mirage F1* (at various times, this aircraft was also called *Super Mirage* and *Super Mirage F1*). Both featured fixed geometry swept wings and had fuselages derived from the *Mirage III*. However, whereas the *Mirage IIIF2* (first flown on June 12, 1966) was a two-seat aircraft powered by a single TF-306 turbofan, the smaller *Mirage IIIF1* was a single-seater powered by a SNECMA *Atar 09K-31* turbojet. Five months after the maiden flight of the *Mirage F1*, Dassault's conservatism was rewarded by an order for three *Mirage F1* pre-production models.

Formula for Success

As indicated above, the Dassault design team had become increasingly aware that variable-geometry fighters and VTOL aircraft, or even large turbofan-powered designs, would be too expensive to fit the limited French military budget or be affordable by some potential export customers. Accordingly, and initially without government backing, the team undertook studies for a less expensive fighter which, nevertheless, offered better performance than the *Mirage III* in terms of increased endurance, reduced approach speed, shorter take-off and landing distances, and improved maneuverability. Development and manufacturing costs were minimized by retaining the basic *Mirage III* fuselage and powering the new aircraft with a developed version of the existing *Atar 9* turbojet offering improved thrust ratings. To achieve these goals, the aircraft was to be fitted with swept wings with double-slotted flaps and maneuvering slats, and swept tail surfaces with low-set stabilators. The use of shoulder-mounted wings necessitated partial redesign of the fuselage to provide space for the main undercarriage. To enable operations from semi-prepared fields, the nose and main landing gear were fitted with twin wheels and tires.

Powered by a single 15,400-lb. th. SNECMA *Atar 09K*, the privately-funded prototype *Mirage F1-(01)* was first flown by René Bigand on December 23, 1966, at Melun-Villaroche. Results were immediately promising and soon after the aircraft demonstrated significantly better performance than that of the *Mirage III*, including shorter take-off distances (reduced by 30%), lower approach speeds (minus 25%), improved combat air patrol endurance (a three-fold increase), and increased combat radius in the ground support role (twice the *Mirage III* figure). Maximum speed was comparable to that of the *Mirage III* with the swept-wing prototype reaching Mach 2.12 during the course of its 15th flight. Unfortunately, the *Mirage F1-01* was lost on May 19, 1967, while practicing for the Paris Air Show. Test pilot René Bigand lost his life in the crash near Fos-Sur-Mer.

Notwithstanding Bigand's accident, French authorities went ahead ten days later with an order for three pre-production aircraft as, indeed, the *Mirage F1* appeared to offer the best solution to equip the *Armée de l'Air* with a more potent warplane without making excessive demands on the national budget. The first of these aircraft, the *Mirage F1-02* flew on March 20, 1969, and, powered by a 14,770-lb. th. *Atar 9K31*, reached Mach 1.15 on its maiden flight. Subsequently re-engined with a 15,870-lb. th. *Atar 9K50* (the powerplant selected for production aircraft), the *Mirage F1-02* was used for performance and handling trials; later on, it was flown extensively by Dassault and Matra (the main French armament manufacturer) with the latter using it primarily for weapons testing. The next two aircraft, the *Mirage F1-03* and *Mirage F1-04*, respectively, flew on September 18, 1969, and June 17, 1970. All three of these aircraft were now fitted with twin ventral fins to improve lateral stability and were used to develop the optimum size of the dog-tooth wing leading edge extensions adopted for the production aircraft ordered in 1969.

Although its high wing loading rendered the *Mirage F1* very stable at low altitudes and thus well suited to the ground attack role, the *Armée de l'Air* had no requirements at that time for strike aircraft as its needs in this category were to be fulfilled in the foreseeable future by *Mirage IIIE*'s and *Jaguar A*'s. Consequently, the *Mirage F1C*'s ordered for the *Armée de l'Air*, beginning with an order for 35 aircraft placed in 1969 (*Mirage F1C* Nos. 1 to 35), were optimized for the air intercept and air superiority missions for which they were armed with two internally-mounted 30-mm cannon, two wingtip-mounted Matra *Magic* infrared-homing air-to-air missiles, and two Matra R 530 air-to-air missiles with either infrared-homing or semi-active radar guidance. Later, the much improved Matra Super 530 replaced the original R 530's. For their secondary air-to-ground mission, the *Mirage F1C*'s were provided with pylons for bombs, rocket launchers and/or 1,200-liter (317-U.S. gallon) drop tanks on a multi-store ventral rack and four underwing racks.

Since entering service in December, 1973, most French *Mirage F1C*'s have been fitted with improved equipment and systems. In particular, antennae for a Thomson-CSF BF passive radar warning receiver (RWR) have been added to the vertical tail surfaces, and the Thomson-CSF *Cyrano IV* radar has been upgraded to provide moving target indication (MTI) for limited look-down capability.

The most significant improvement, however, has been the addition of an inflight refueling capability to at least 81 aircraft. This was accomplished by fitting a non-retractable probe, bolted forward of the cockpit and canted to starboard, with the installation resulting in an 8-cm (3-1/8-in) increase in fuselage length forward of the windshield to provide space for the plumbing. On the basis of a trial installation on the first production *Mirage*

(1) The company traces its origins to Avions Marcel Bloch which had been organized in 1929 by Mr. Marcel Bloch. In 1936-37 this firm was taken over by the Socialist government then in power. Marcel Bloch, however, remained with the nationalized company as an administrator-delegate until forced underground during the German occupation. Marcel Bloch continued surreptitiously to direct his design team until captured by the *Gestapo* and sent to the notorious concentration camp at Buchenwald. Fortunate to survive this ordeal, Bloch, at the end of the war, organized a new private company, Avions Marcel Dassault SA ("Dassault", the phonetic rendering of the French words "d'assaut"—of assault, had been adopted by his brother during wartime underground operations). The present Avions Marcel Dassault-Breguet Aviation (AMD-BA) resulted from a 1971 merger with Breguet Aviation. In January, 1979, the French Government acquired 21% of the AMD-BA stock to become a strong minority shareholder of the country's largest manufacturer of military aircraft.

F1 Overview:

Michel Fournier

A "Mirage F1C" of E.C. 2/30 is seen wearing the standard grey-blue with light grey under surfaces scheme now considered standard on all "Armée de l'Air" "Mirage F1's". Unit markings are typically displayed on the vertical fin. The individual aircraft identification is typically displayed on the aircraft nose.

Michel Fournier

A "Mirage F1C" of E.C. 3/30 mounting two MATRA 550 "Magic" short range air-to-air missiles on its wingtip rails. Visible in the background is the aircraft's hardened protective shelter, typical of such facilities throughout Europe. The E.C. 3/30 vertical fin patch is readily discernible.

performance improvements were predicted; notably, the initial climb rate was projected to increase by 11,810 ft./min. and the hi-lo-hi combat radius with four 1,000-lb. bombs was calculated to be 75 miles longer.

In spite of the better performance promised by the M53-powered aircraft, the *Armée de l'Air* showed no interest in this version as it preferred to wait for the more potent (but eventually still-born) ACF. However, as the *Mirage F1E-M53* would have had a tough time finding favor with potential export customers without the backing of its home customer, consideration was briefly given to substituting 20 of these aircraft for the last French batch of *Mirage F1C*'s. In the end, while actively continuing to seek a contract from the four NATO nations, France planned to build only three *Mirage F1E-M53*'s: two single-seat fighters and a two-seat combat trainer prototype, the *Mirage F1D-M53*.

The first and, as it turned out, only *Mirage F1E-M53* prototype entered flight trials on December 22, 1974, when Guy Mitaux-Maurouard took it on its maiden flight at Istres. Unfortunately for Dassault, the aircraft was by then embroiled in a controversy. Paul Stehlin—a former Chief of Staff of the *Armée de l'Air* who since his retirement had represented Hughes Aircraft and Northrop Corporation in Europe while serving as a member of the *Assemblée Nationale* (France's House of Representatives)—had widely circulated a letter dated October 7, 1974, in which he stated that in the case of the F-104 replacement, the American proposition was the only one to have merit and was the one he had advocated for years.

The "American proposition" to which Gen. Stehlin referred in his notorious letter was the anticipated winner of the LWF (Lightweight Fighter) competition which was then pitting the Northrop YF-17 against the General Dynamics YF-16. As is now well-known, on January 13, 1975, the YF-16 was declared the winner of the competition and 15 F-16 full-scale engineering and development aircraft were ordered. Not quite five months later, on June 7, the four NATO countries (Belgium, Denmark, the Netherlands, and Norway) jointly announced their selection of the F-16A to replace their F-5A's, F-100D's, and F-104G's. Dassault had lost the "Deal of the Century" and its M53-powered *Mirage F1* faded into oblivion.

Although bitterly criticized in the non-specialized French press, the decision against the M53-powered *Mirage F1* was obviously understood by the leadership of the *Armée de l'Air* which had already rejected this aircraft, subsequently, to obtain a fighter in the F-16 class, it had cancelled the proposed ACF and ordered the *Mirage 2000*. The latter entered French squadron service in July, 1984, with *Escadron de Chasse 2/2 "Cigognes"*, five and a half years after the Belgian Air Force had accepted the first NATO F-16A's.

SERVICE HISTORY:

Mirage F1's for the Home Market

As could be expected, and even though at first it wanted the ACF and ordered 35 *Mirage F1C*'s only as an inducement for export orders, the *Armée de l'Air* became the principal *Mirage F1* customer. Thus, the most important version in French service is the *Mirage F1C/F1C-200*, with 81 F1C's and 81 F1C-200's having been delivered between March, 1973, and December, 1983. By the end of 1984, 13 of these had been lost in operational accidents or damaged beyond economical repair. Twenty *Mirage F1B*'s were delivered between October, 1980, and March, 1983, and all remained in service at the end of 1984. Whereas the F1C's/F1C-200's and F1B's were built for, and are operated by, the *Commandement "Air" des Forces de Défense Aérienne* (CAFDA, the French Air Defense Command), the *Mirage F1CR*'s were ordered for the *Force Aérienne Tactique* (FATac, the French Tactical Air Command). At the end of 1984, 32 F1CR's had been delivered since December, 1982, and 32 were on order, with the last deliveries expected to take place in 1987.

To avoid repetition of service use and still provide an adequate description of the organization of the *Armée de l'Air*, an overview of this organization follows. The major commands of the *Armée de l'Air* (i.e., the previously mentioned CAFDA and FATac, as well as the *Forces Aériennes Stratégiques*—FAS, Strategic Air Forces, and the *Commandement du Transport Aérien Militaire*—CoTAM, Military Air Transport Command) are basically divided into *Escadres* (Wings). The *Mirage F1C/F1C-200/F1B*'s serve in *Escadres de Chasse* of the CAFDA and the *Mirage F1CR*'s in an *Escadre de Reconnaissance* of the FATac.

Typically, three or four *Escadrons* (Squadrons) are assigned to each *Escadre*, with the fighter squadrons being called *Escadrons de Chasse* and the reconnaissance squadrons, *Escadrons de Reconnaissance*. The squadrons are further divided into two *Escadrilles* (Flights). Interestingly, and contrary to U.S. practice, the *Escadrilles*—and not the squadrons or wings—provide the link with the past as each *Escadrille* bears the numerical designation and insignia of either a WWI unit from the *Aéronautique Militaire* (the Army branch which controlled French military aviation until 1935 when the *Armée de l'Air* became an independent service), a WWII unit of the *Armée de l'Air* or *Forces Aériennes Francaises Libres* (Free French Air Force), or a defunct unit of the *Aéronautique Navale* (French Naval Aviation). Thus, it is the *Escadrille*'s patch which aircrews wear on their flight suits. Moreover, the insignias carried on the fin of French *Mirage F1*'s are those of the *Escadrilles*. However, as for maintenance and operational purposes aircraft are assigned to the *Escadrons* and not to the *Escadrilles*, each aircraft bearing the insignia of the two *Escadrilles*, one on each side of the fin. In the less frequent case of *Escadrons* not being divided into traditional *Escadrilles*, the *Escadron*'s insignia is borne on both sides of the fin.

Other unit identification markings consist of an alpha-numeric designator in which the digit(s) identify the *Escadre*, the first letter distinguishes the *Escadron*, and the second letter provides a means of identifying individual aircraft within the *Escadron*.

Prior to entering squadron service, the *Mirage F1* variants were first tested at the *Centre d'Essais en Vol* (C.E.V., Flight Test Center, with its main facilities at Bretigny, an alternate airfield at Istres, and an armament testing station at Cazaux) and then evaluated at the *Centre d'Expériences Aériennes Militaires* (C.E.A.M., Military Air Evaluation Center at Mont-de-Marsan). The *Armee de l'Air* took delivery of its first *Mirage F1C* on May 24, 1973 when Cdt. Chretien (later to become a "cosmonaut" as the first French astronaut to fly in a Soviet *Soyuz*) delivered the second production aircraft to the C.E.A.M. Upon completion of these tests and evaluations, the *Mirage F1* variants were cleared for service with the operational units as follows.

Initial deliveries to an operational unit were made on December 20, 1973, when seven aircraft arrived at Reims-Champagne (*Base Aérienne 112* or B.A. 112, Air Base No. 112) to commence the conversion of the *30ème Escadre de Chasse Tous Temps* (30th All-weather Fighter Wing, later becoming simply the *30ème Escadre de Chasse*/30th Fighter Wing) from Sud-Ouest S.O. 4050 *Vautour II N* all-weather fighters. These first aircraft were assigned to *Escadron de chasse tous temps 2/30* (or E.C.T.T. 2/30, All-weather Fighter Squadron 2/30) which bore the name *"Normandie-Niemen"* and carried the tradition of the WWII Free French unit which flew Soviet-built Yak-9's and Yak-3's over the Russian front. Still based at B.A. 112, this squadron is now simply designated E.C. 2/30 and flies a mix of F1C's and F1C-200's which are coded from 30-MA on. A second squadron, E.C.T.T. 3/30 (now E.C. 3/30), bearing the name *"Lorraine"* and comprised of two non-traditional *Escadrilles* (named *"Nancy"* and *"Metz"* after the two main cities in the Lorraine province) converted to *Mirage F1C*'s during the spring of 1974 and is still current with its *Mirage F1C/F1C-200*'s being coded in the 30-FA range. On April 1, 1985, these two squadrons were joined at B.A. 112 by a third one when the *10ème Escadre de Chasse* was dissolved and its former E.C. 1/10 *"Valois"* became E.C. 1/30 *"Valois"* with F1C's and F1C-200's coded from 30-SA on.

The next wing to receive *Mirage F1C*'s was the *5eme Escadre de Chasse* at B.A. 115 Orange-Caritat. Its E.C. 1/5 *"Vendée"*, comprised of *Escadrilles SPA 124 and SPA 26, converted from Mirage IIIC*'s to *Mirage F1*'s beginning in March, 1975 (codes 5-NA on). *Escadron de chasse 2/5 "Ile de France"* (*Escadrilles* named "Paris" and "Versailles"; aircraft coded 5-OA on) followed in July, 1975. A third squadron, E.C. 3/5 *"Comtat-Venaissin"*, with *Escadrilles* ERC 571 and SPA 171 (with a third flight, SPA 62, added in December, 1985) acting as operational training units and mainly equipped with *Mirage F1B* two-seaters coded from 5-AA on, was activated on April 1, 1981.

At B.A. 103 Cambrai-Epinoy, three squadrons of the *12ème Escadre de Chasse* are currently flying a mix of F1C's and F1C-200's. Beginning at the end of 1976, *Mirage F1C*'s were initially assigned to the E.C. 2/12 (shortly thereafter renumbered 3/12) *"Cornouaille"* (with its two *Escadrilles*, the *"Scorpion"* and *"Dogue"*, not carrying the traditions of older units) in which they received codes from 12-ZA when replacing the unit's *Super Mystère B2*'s. The last *Super Mystère B2*'s of the *Armée*

Production Summary and Serial Numbers

(listing as of January 1, 1985)

Model	Serial Number	Quantity	Customer	Delivery Dates	Attrition Up to 12/31/84	Remark
Prototypes						
Mirage F1	01 to 04	4	France		1	Prototypes.
Mirage F1E-M53	01	1	France		0	Prototype with M53 engine.
	sub-total protos	5			1	
Mirage F1A variants						
Mirage F1AD	401 to 416	16	Libya	Jan '78–Apr '79	2	
Mirage F1AZ	216 to 247	32	South Africa	Nov '75–Oct'76	2	
	sub-total F1A	48			4	
Mirage F1B variants						
Mirage F1B	501 to 520	20	France	Oct '80–Mar '83	0	
Mirage F1BD	201 to 206	6	Libya	Apr '78–Oct '79	2	
Mirage F1BE	CE.14A-26 to CE-14A-31	6	Spain	Oct '80–Nov '81	1	
Mirage F1BJ	2518 to 2519	2	Jordan	Mar '81–Apr '81	0	
Mirage F1BK	771 to 772	2	Kuwait	Oct '77	1	Served as prototypes for the two-seat trainer version of the Mirage F1.
Mirage F1BK-2	773 to 776	4	Kuwait	On order	0	
Mirage F1BQ	4000 to 4003	4	Iraq	Jul '80–Jul '81	0	
Mirage F1BQ-2	4504 to 4505	2	Iraq	Apr '82–Jul '82	0	
Mirage F1BQ-3	4556 to 4558	3	Iraq	Jun '84–Dec '84	0	
Mirage F1DDA	QA 61 to QA 62	2	Qatar	Apr '83–May '83	0	
Mirage F1JE	830 to 831	2	Ecuador	Sep '80–Nov '80	1	
	sub-total F1B	53			5	
Mirage F1C variants						
Mirage F1C	See text	81	France	Mar '73–Apr '77	6	
Mirage F1C-200	See text	81	France	Mar '77–Dec '83	7	Two other F1C-200's were modified as Mirage F1CR prototypes.
Mirage F1CE	C.14A-1 to C.14A-15	15	Spain	Mar '75–Nov '76	3	
	C.14A-16 to C.14A-25	10	Spain	Jun '78–May '79	0	
	C.14A-32 to C.14A-51	20	Spain	Mar '80–Dec '81	1	
Mirage F1CG	101 to 140	40	Greece	Feb '75–Apr '78	7	
Mirage F1CH	126 to 155	30	Morocco	Feb '78–Dec '79	9	
Mirage F1CJ	2501 to 2517	17	Jordan	Jan '81–Jun '82	1	
Mirage F1CK	701 to 718	18	Kuwait	Feb '76–Jun '77	6	Since brought up to CK-2 standards.
Mirage F1CK-2	719 to 727	9	Kuwait	On order	0	
Mirage F1CZ	200 to 215	16	South Africa	Sep '74–Jul '75	2	
Mirage F1JA	801 to 816	16	Ecuador	Dec '78-Dec '79	2	
	sub-total F1C	353			44	
Mirage F1CR variants						
Mirage F1CR	601 to 632	32	France	Dec '82–Dec '84	0	Including two modified from F1C-200 airframes.
Mirage F1CR	633 to 664	32	France	On order	0	
	sub-total F1CR	64			0	
Mirage F1E variants						
Mirage F1ED	501 to 516	16	Libya	Jan '78–Oct '79	1	
Mirage F1EDA	QA 71 to QA 82	12	Qatar	Mar '83–Jul '84	0	
Mirage F1EE	C.14B-52 to C.14B-73	22	Spain	Oct '81–Mar '83	0	
Mirage F1EH	156 to 169	14	Morocco	Dec '79–Jul '82	2	
Mirage F1EH-200	170 to 175	6	Morocco	Jul '80–Jul '82	1	
Mirage F1EJ	101 to 117	17	Jordan	Jun '82–Jun '83	0	
Mirage F1EQ-1/-2	4004 to 4035	32	Iraq	Apr '80–Feb '82	5	
Mirage F1EQ-4	4500 to 4503 and 4506 to 4529	28	Iraq	Dec '82–Jul '84	2	
Mirage F1EQ-5	4560 to 4579	20	Iraq	Dec '83–early '85	0	
	Sub-total F1E	167			11	
	GRAND TOTAL	**690**			**65**	

As of January 1, 1985, AMD-BA reported the sale of 690 *Mirage F1*'s including five prototypes, 246 aircraft for the *Armée de l'Air*, and 439 for export. Deliveries up to that time were said to total 642 aircraft including the five prototypes, 214 aircraft to the *Armée de l'Air*, and 423 aircraft to export customers.

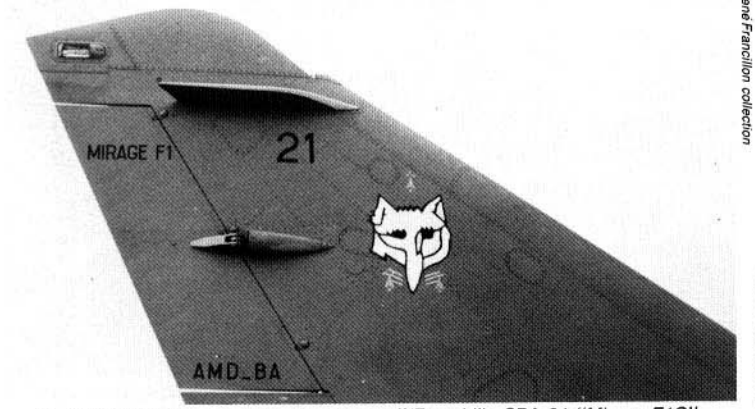
On September 25, 1985, AMD-BA announced that Iraq had ordered 24 *Mirage F1EQ-6*'s, bringing the F1E sub-total to 191 and the grand total to 714.

de l'Air were phased out on October 1, 1977, when E.C. 1/12 *"Cambrésis"* completed its conversion to *Mirage F1C*'s; the squadron's *Escadrilles* are the SPA 162 and SPA 89 and its aircraft are coded from 12-YA. *Escadron de Chasse 2/12 "Picardie"* and its two traditional *Escadrilles*, the SPA 173 *"Oiseau Bleu"* and the SPA 172 *"Perroquet"*, were re-activated on *Mirage F1C*'s on June 1, 1980. Its aircraft are coded from 12-KA onwards.

The shortest-lived *Mirage F1* unit in the air defense role, the *Escadron de Chasse 1/10 "Valois"* (E.C. 1/10 comprised of *Escadrilles* SPA 84 and SPA 93) converted from *Mirage IIIC*'s at B.A. 110 Creil-Senlis beginning in September, 1981 (aircraft coded 10-SA onward). In the spring of 1985, this squadron and its F1C's and F1C-200's were transferred to the *30ème Escadre de Chasse*.

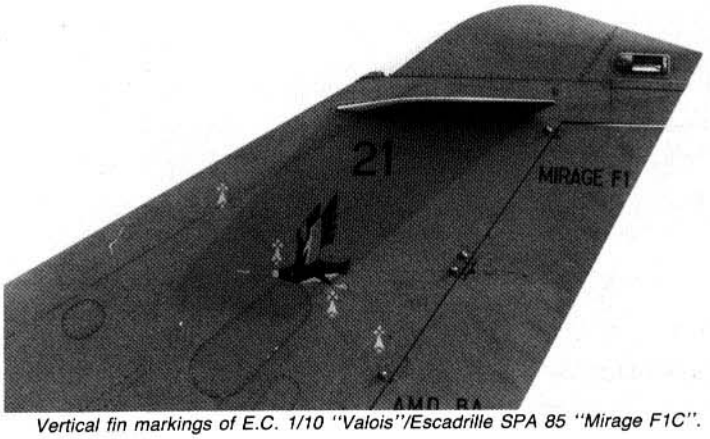
In addition to their normal peacetime operations in France, the *Mirage F1C-200*'s have deployed overseas with increasing frequency. The *5ème Escadre de Chasse* first demonstrated the feasibility of long-distance deployments in January, 1980, when, refueled by Boeing C-135F's, four of its aircraft flew non-stop from Solenzara on the island of Corsica to Djibouti in West Africa in 5½ hours. In 1983 this capability came in handy when, at the

SELECT TAIL MARKINGS:



René Francillon collection

Vertical fin markings of E.C. 1/10 "Valois"/Escadrille SPA 84 "Mirage F1C".



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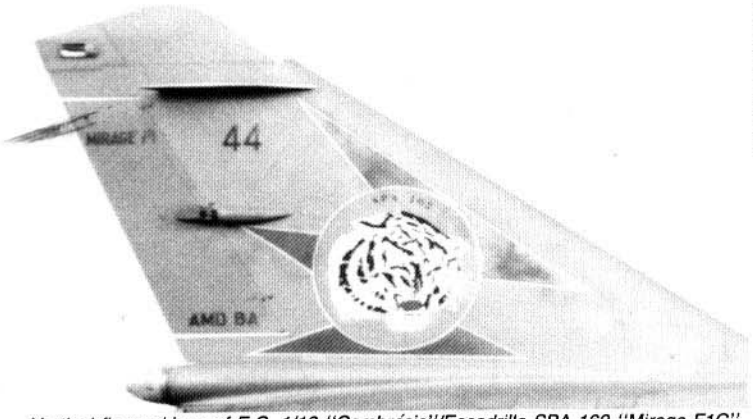
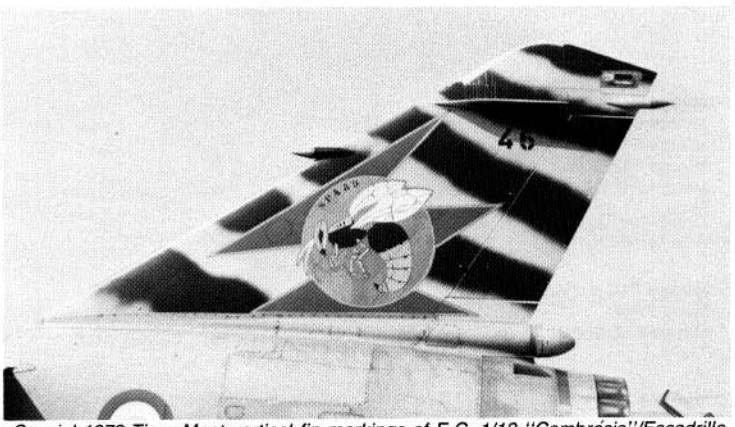
Vertical fin markings of E.C. 1/10 "Valois"/Escadrille SPA 85 "Mirage F1C".



René Francillon collection

Vertical fin markings of E.C. 1/12 "Cambrésis"/Escadrille SPA 162 "Mirage F1C".



Alain Pelletier

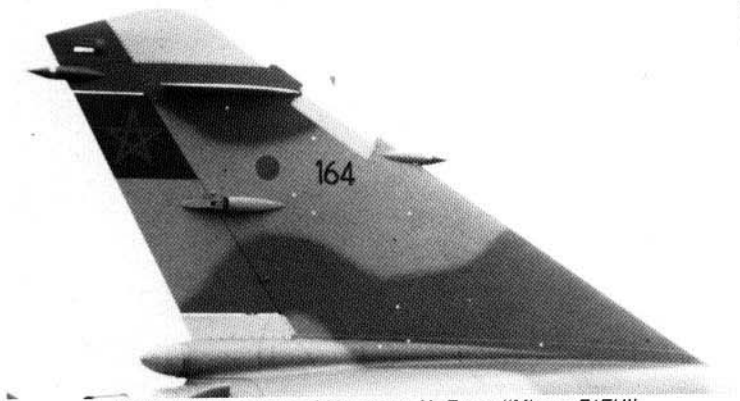
Special 1979 Tiger Meet vertical fin markings of E.C. 1/12 "Cambrésis"/Escadrille SPA 89 "Mirage F1C".

Michel Fournier

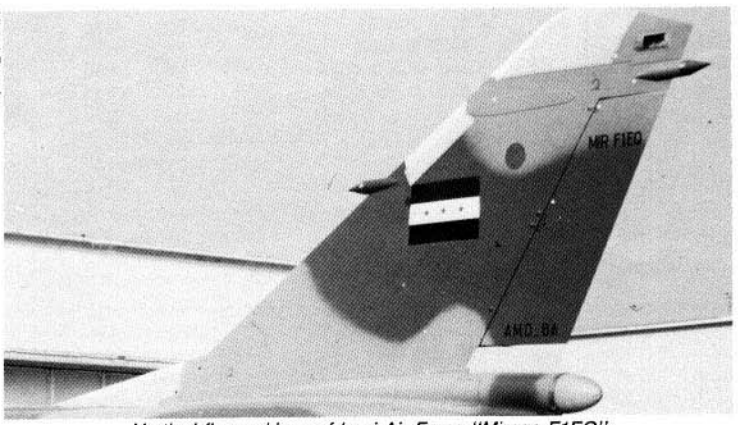
Vertical fin markings of E.C. 2/33 "Savoie" "Mirage F1CR".

Alain Pelletier

Vertical fin markings of Greek Air Force "Mirage F1CG".



Vertical fin markings of Moroccan Air Force "Mirage F1EH".



Michel Fournier

Vertical fin markings of Iraqi Air Force "Mirage F1EQ".

request of the government of Chad, France agreed to supply military forces to help prevent a feared Libyan intervention in support of rebels. Known as *"Operation Manta"*, this deployment got underway in August, 1983, with the first CAFDA *Mirage F1C-200*'s arriving at the N'Djamena airport on August 23 to provide air defense and to escort other types of French combat and transport aircraft. Following negotiations with the Libyan leader, Col. Qaddafi, French forces departed from Chad in September, 1984, without the need for the *Mirage F1C-200*'s to tangle with Libyan aircraft. Nevertheless, to act as a deterrent, *Mirage F1C-200*'s continue to be frequent visitors to nearby Bangui in the Central African Republic.

The F1CR, the latest and probably last version of the *Mirage F1*, reached an operational unit in July, 1983, when the first aircraft were delivered to B.A. 124 Strasbourg-Entzheim to replace *Mirage IIIR*'s of the *Escadron de Reconnaissance 2/33 "Savoie"*. In 1985 E.R. 2/33 began exchanging its initial F1CR's (coded 33-NA and up) for aircraft of a latter standard and its first aircraft were returned to Dassault to be brought up to that standard prior to assignment to one of the two other squadrons of the 33ème Escadre.

Non-Indigenous Mirage F1 Operators

The *Mirage F1* achieved its first export success in 1971 when an established Dassault customer, the *South African Air Force*, ordered F1AZ's and F1CZ's to supplement its *Mirage IIIBZ/CZ/RZ/R2Z*'s. The latest addition to the export customers' list is the *Qatar Emiri Air Force*, bringing the number of air forces flying *Mirage F1*'s to 11. By January 1, 1985, 423 *Mirage F-1*'s had been delivered abroad. In addition to the F1CR's on order for the *Armée de l'Air*, the type remains in limited production for the air forces of Iraq and Kuwait. Moreover, additional orders are expected from Iraq, Jordan, and Kuwait.

Outside of France, *Mirage F1*'s are operated by the air forces of the following ten countries:

Ecuador: During President Carter's term in office, the United States futilely attempted to limit the introduction of modern and expensive weaponry in Latin America, thus prompting nations in the area to seek non-U.S. suppliers for their air forces. Notably, when Peru could not acquire the Northrop F-5E's it wanted, it turned to the Soviet Union and ordered Sukhoi Su-22 *Fitter-F*'s. At that time, worried by the new offensive capabilities of its southern neighbor (Ecuador and Peru have long had a simmering dispute over portions of the Amazon basin), Ecuador vainly sought from the United States a commitment to supply F-5E's and/or to authorize the export of General Electric J79 turbojets to power the 24 IAI *Kfir C2*'s it was planning to order from Israel. The State Department's staunch opposition to either alternative provided France with an opportunity to boost *Mirage F1* exports. In late 1977, Ecuador became the ninth customer for the type when it ordered 16 *Mirage F1JA* single-seaters (serials FAE 801 to FAE 816) and two *Mirage F1JE* two-seaters (serials FAE 830 and FAE 831) which respectively are customized versions of the *Mirage F1C* and *Mirage F1B*.

Deliveries to the *Fuerza Aérea Ecuatoriana* (FAE, or Ecuatorian Air Force) began in December, 1978, and were completed in November, 1980. Barely after reaching operational status with its *Mirage F1JA*'s, Grupo de Caza 212, Escuadrilla 2121 (212th Fighter Group, 2121st Fighter Squadron) found itself flying combat air patrols during 13 days of border skirmishes between Ecuador and Peru in January-February 1981. The unit's only interception of intruding Peruvian *Fitters* was inconclusive as the pilot of one of its *Mirage F1JA*'s launched a Matra *Magic* air-to-air missile outside of the weapon's flight envelope.

Since entering service at the Taura Air Base, two F1JA's (810 and 815) and one F1JE (831) have been lost in operational accidents. However, two additional incidents have demonstrated the *Mirage F1*'s ruggedness. One aircraft returned safely to base after losing one-third of its left stabilator and damaging its left wing leading edge in a collision with a transmission line, while another survived a bird strike during a low-level exercise. In this latter instance, a condor flattened the windshield, smashed the gunsight, and ended up against the pilot's helmet (fortunately, both helmet visors were down). The pilot maintained control and, after the windshield popped back up, made a successful landing from which he walked away covered spectacularly with blood!

Greece: A maverick NATO member, Greece first contemplated acquiring *Mirage F1*'s in 1972 as part of a multinational agreement whereby AMD-BA was to provide 20 percent of the capital for the proposed Hellenic Aircraft Industries (HAI). However, following the selection of McDonnell F-4E's to equip two squadrons of the *Helliniki Aeroporia* (Hellenic Air Force), Dassault withdrew its HAI support and the *Mirage F1* sale fell through in 1973. Eighteen months later, renewed tension between Greece and Turkey and the Greeks' resultant fear of a possible American arms embargo, led to the resumption of negotiations with France. A contract for the supply of 40 *Mirage F1CG*'s was signed in June, 1974.

Similar to the French *Mirage F1C*'s (in fact several of these aircraft were diverted from *Armée de l'Air* contracts to enable the first Greek aircraft to be delivered in February, 1975) but modified to carry AIM-9J *Sidewinders* in place of the wingtip-mounted *Magics*, the *Mirage F1CG*'s were given serials 101 to 140 and were used to replace the Convair F-102A's of the 114a *Pterix Mahis* (114th Combat Wing) at Tanagra Air Base. In early 1985, nearly nine years after entering service with that wing, 33 *Mirage F1CG*'s still equipped its two squadrons, the 334 *"Thalos"* and 342 *"Sparta" Mire Anagaitiseos* (Interceptor Squadrons).

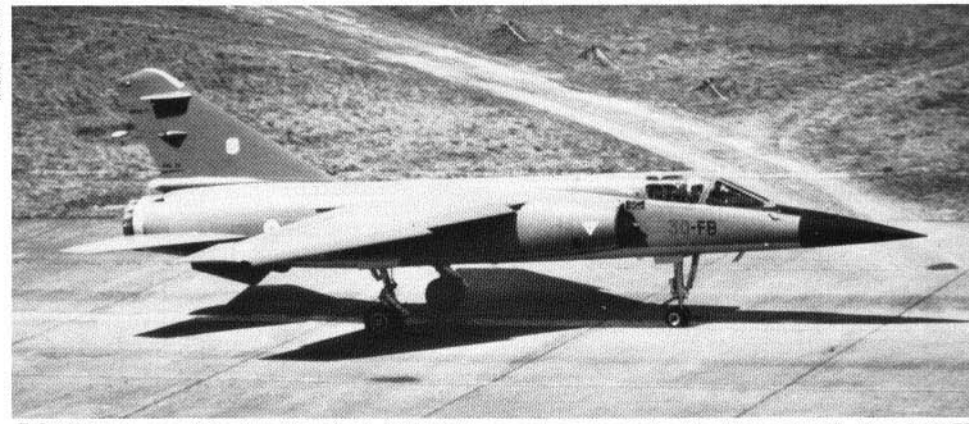
Late in 1984, it was reported that, as an offset to the Greek purchase of 40 *Mirage 2000*'s, Hellenic Aerospace Industries was to be granted "exclusive world rights to *Mirage F1* general repairs and spare parts manufacture." However, it appears that at the present HAI only has limited rights to overhaul and repair aircraft and engines of the Greek Air Force and of some other operators in the Middle East.

Iraq: Largest export customer for the *Mirage F1*, *Al Quwwat al Jawwaiya al Iraqiya* (the Iraqi Air Force) has flown and, in the fall of 1985 when this was written, continued to fly its *Mirage F1*'s extensively in combat operations against Iran. Iraq first contemplated acquiring *Mirage F1*'s in early 1970 but no agreement was reached with Dassault. Negotiations resumed in 1975 and were concluded two years later when Iraq signed a contract for 32 E-series single-seaters (18 *Mirage F1EQ-1*'s, serials 4004 to 4021, and 14 *Mirage F1EQ-2*'s, serials 4022 to 4035) and four *Mirage F1BQ-1 and -2* two-seaters (4000 to 4003) to supplement its sizeable inventory of Soviet-built aircraft. The first F1EQ flew on May 28, 1979, and the first F1BQ on February 6, 1980, with deliveries spread over the 22-month period from April, 1980, until February, 1982. Spurred by its war with Iran, Iraq has since placed two repeat orders for 24 and 29 aircraft respectively. The first was comprised of two *Mirage F1BQ-3* two-seaters (4504 and 4505, both fitted with an inflight refueling probe) and 22 *Mirage F1EQ-4* single-seaters (4500 to 4503, and 4506 to 4523, all fitted with a refueling probe and further modified to carry a Douglas buddy refueling pod beneath the fuselage). The final contract covered three additional *Mirage F1BQ-3*'s (4556 to 4558), six *Mirage F1EQ-4*'s (4524 to 4529), and 20 *Mirage F1EQ-5*'s (4560 to 4579). The last *Mirage F1* ordered by Iraq prior to 1985, an EQ-5, was delivered in early 1985. An additional 24 EQ-6's have now been ordered.

The F1EQ-4 and F1EQ-5 are variants specifically developed for the Iraqi Air Force, the former being equipped to carry the Matra/Dassault *Harold* reconnaissance ventral tank and the latter being fitted to launch AM39 *Exocet* air-to-surface missiles. At least two types of *Harold* TV/camera pod configurations are known to be carried by the F1EQ-4's, one for conventional reconnaissance and one for long-range oblique photography. The F1EQ-5—no photographs of which have yet been released by the security-conscious Iraqi or their equally publicity-shy suppliers—is the most potent version of the *Mirage F1*. Fitted with specialized avionics, the *Mirage F1EQ-5*'s are optimized for the anti-shipping role and carry *Exocet* air-to-surface missiles. Even though the F1EQ-5 first flew on July 7, 1983, and deliveries commenced in December of that year, Dassault and the Iraqi have succeeded so far in keeping this version under wrap. The success of this policy has led most sources to ignore the *Mirage F1EQ-5* and to credit all *Exocet* attacks in the Persian Gulf to the five Dassault *Super Etendards* loaned to Iraq pending delivery of its F1EQ-5's.

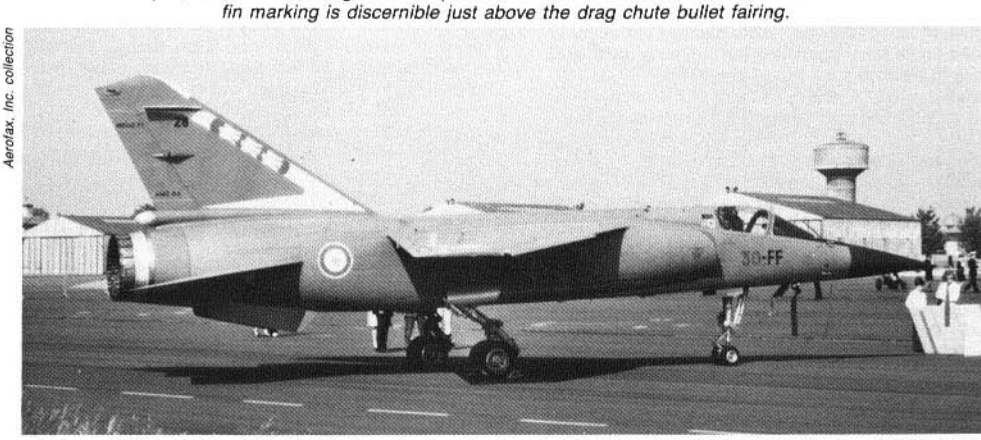
After skirmishing intermittently for ten months over the sovereignty of the disputed Shatt al-Arab waterway that separates the two countries, Iraq and Iran went to war on September 22, 1980. Benefitting from a steady supply of aircraft and parts—with *Mirage F1*'s being supplemented by additional deliveries of Soviet- and Chinese-built fighters—the Iraqi Air Force soon established air superiority over the *Iranian Islamic Revolu-*

Michel Fournier



E.C. 3/30 was one of the first "Armée de l'Air" fighter squadrons to receive the "Mirage F1C". Aircraft 30-FB is seen in April, 1982, while taxiing out for a practice mission at a base in France. The E.C. 3/30 vertical fin marking is discernible just above the drag chute bullet fairing.

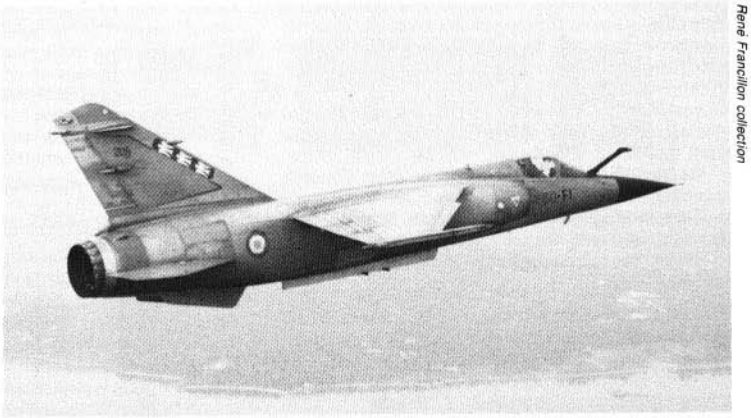
Aerofax, Inc. collection



"Mirage F1C", 30-FF, of E.C. 3/30 "Lorraine" at the St. Disier air base during an open house in May, 1974. The yellow, red, and white E.C. 3/30 vertical fin markings are quite distinctive and readily visible. As shown, the markings have been reduced in size since 1982.

Patrick Bigel

"Mirage F1C", 30-FK, of E.C. 3/30 "Lorraine" being fueled for a practice mission from its French base. The "Mirage F1" has a single-point refueling system. Hardened shelter in the background is of concrete and steel construction.



René Francillon collection

"Mirage F1C-200", 30-FI, of E.C. 3/30 "Lorraine" over Corsica during a practice intercept mission. This aircraft is equipped with an ALKAN 910 centerline pylon and two wingtip missile rails.

tionary Air Force which had difficulty obtaining parts for its U.S.-built aircraft. Nevertheless, in May, 1982, Iran succeeded in driving Iraqi troops back across the border. Since then, the stalemate has been broken by occasional Iranian offensives, which have been repelled by Iraq through massive use of artillery and air support, and by repeated Iraqi attacks against shipping in the Persian Gulf and oil tanker loading facilities at Kharg Island.

In the process, the multi-role *Mirage F1EQ*'s have escorted Tu-22 *Blinders*, MiG-25 *Foxbats* and *Super Etendards*; undertaken interception, air support and interdiction missions; and flown anti-shipping strikes and reconnaissance sorties. Normally stationed at the newly built Qayyarah West Air Base, south of Mosul, the Iraqi *Mirage F1*'s deploy to forward bases for air superiority/air support missions over the battle lines and to bases closer to the Persian Gulf for anti-shipping operations.

Combat and operational losses up to the end of 1984 totaled seven aircraft, with a number of heavily damaged *Mirage F1*'s also being returned to Dassault for major repairs. These losses are to be more than offset by an order for 24 *Mirage F1EQ-6*'s which was announced in September, 1985.

Iraqi sources have claimed that during the first three years of the war alone the French-built fighters had shot down more than 40 Iranian aircraft, mostly F-4's and F-5's but also at least three of the much-vaunted F-14A's (a confirmed victory over a *Tomcat* having been obtained near Dehrayan on November 21, 1982). Most of these victories are said to have been obtained with Matra Super 530 air-to-air missiles. In the anti-shipping role, the use of *Exocets* by their *Mirage F1EQ-5*'s has not been acknowledged by the coy Iraqis who are content to let the credit for such controversial attacks be given to their better known *Super Etendards*.

Jordan: Currently operating two squadrons of *Mirage F1*'s, *Al Quwwat al Jawwiya al Malakiya al Urdiniya* (the Royal Jordanian Air Force) first ordered 17 F1CJ interceptors (serials 2501 to 2517) and two F1BJ two-seat trainers (2518 and 2519). Delivered between January, 1981, and June, 1982, these 19 aircraft were used to form No. 25 Squadron, a new unit based at Azraq. Seventeen F1EJ strike fighters (101 to 117) followed between June, 1982, and June, 1983, to replace F-104A's in No. 1 Squadron at Mafraq. Having only lost one *Mirage F1CJ* by the end of 1984, in early 1985 the visibly pleased Royal Jordanian Air Force was negotiating the purchase of 13 more F1EJ's to equip a third squadron.

Kuwait: In 1973, after rejecting a U.S. offer for the lease of 32 refurbished Vought F-8 *Crusaders* and the later sale of more modern fighters, *Al Quwwat al Jawwiya al Kuwaitiya* (the Kuwait Air Force) ordered 20 *Mirage F1*'s. Noteworthy is the fact that the Kuwait Air Force was the launch customer for the two-seat version of the *Mirage F1*; its initial order included two *Mirage F1BK*'s (771 and 772) as well as 18 *Mirage F1CK* single-seat interceptors (701 to 718). Preceding the two-seaters, the prototype of which first flew on May 26, 1976, the F1CK's were delivered between February, 1976, and June, 1977; the two F1BK's followed in October, 1977.

Operating mainly from the military facilities at the Kuwait International Airport, Kuwaiti-and Pakistani-flown *Mirage F1*'s have suffered a larger than average number of accidents, with the loss of six single-seaters (one of which took place prior to delivery on January 15, 1977), and one two-seater being reported by the end of 1984. To make up for these attritions, in 1983 the Kuwait Air Force ordered nine F1CK-2 single-seaters (719 to 727 which featured improved avionics) and four F1BK-2's (773 to 776) for delivery by mid-1985. At the same time, the Kuwait Air Force contracted with Dassault to have its surviving *Mirage F1*'s brought up to the new standards. Negotiations for a final batch of 12 *Mirage F1*'s were reported in late 1984-early 1985 but confirmation of this order had not been released at the time of this writing.

Libya: As long as Col. Muammar al-Qaddafi rules this oil rich North African nation, the sale of *Mirage F1*'s will remain a two-edged sword for France. On one hand, the sale did enable France to secure the supply of oil on favorable terms from a relatively close source and with shipping not subject to risks prevailing in the Middle East. On the other hand, France and Libya twice came close to war when the Libyans threatened to use their *Mirage F1*'s in support of rebels operating against French-backed government forces in Mauritania during the mid- to late 1970's, and in Chad, since the mid-1960's. The greatest risk of *Mirage F1* vs. *Mirage F1* combat developed in 1983-84 when French aircraft were deployed to Chad as part of the previously mentioned *Operation Manta*. In fact, just prior to the arrival of French *Mirage F1C-200*'s in Chad, Libyan *Mirage F1*'s, Su-22's, and MiG-23's did bomb and strafe Chadian forces. Prudently, the Libyans avoided returning over Chad while the *Armee de l'Air* was around . . .

Having already obtained large numbers of Soviet aircraft as well as 110 *Mirage 5*'s, *Al Quwwat al Jawwiya al Jamariyah al Arabiya al Libya* (the Libyan Arab Republic Air Force, or LARAF) ordered 16 *Mirage F1AD*'s (serials 401 to 416), six F1BD's (201 to 206), and 16 F1ED's (501 to 516), all of which were delivered between January, 1978, and October, 1979. Equipping two squadrons of a Fighter Regiment, the Libyan *Mirage F1*'s initially operated from the Gamal Abdel Nasser Air Base on the Mediterranean Coast near the Egyptian border. They were later transferred to a new base in the southern desert, near Chad, with a forward operating base (complete with a 13,125-ft. (4,000-m.) runway) being built at Faya-Largeau in the northern third of Chad where Libyan-backed rebels are in control.

Like other high-performance aircraft in Libya, the *Mirage F1*'s are largely flown by French and Pakistani mercenaries, and maintained by North Korean, East German, and Pakistani personnel. Even though French sources claim that limited flying is taking place, five Libyan *Mirage F1*'s have been lost in accidents through the end of 1984. More would have been lost if the erratic Libyan leader, Col. Qaddafi, had carried forth his lunatic scheme to intervene in Mauritania. Lacking air tankers to refuel its *Mirage F1AD*'s, LARAF planned a one-way mission against the Mauritanian capitol . . .

Morocco: Like those of the Iraqi Air Force, the *Mirage F1*'s of the *Force Aérienne Royale Marocaine* (Royal Moroccan Air Force) have seen extensive combat operations. The Moroccan aircraft, however, have been used exclusively in the strike/reconnaissance role in the little-known war opposing the Kingdom of Morocco to the Polisario Front, an Algerian-supported rebel group seeking to establish an independent country in the Western Sahara (the area south of Morocco's original border which it annexed in April, 1976, when Spain withdrew from the Spanish Sahara).

Morocco has acquired fifty *Mirage F1*'s including 30 F1CH's (serials 126 to 155), 14 F1EH's (156 to 169), and six F1EH-200's (170 to 175, fitted with an air refueling probe), with deliveries extending from February, 1978, until June, 1982. Due to the threat of a Libyan intervention in the Western Sahara conflict, initial deliveries were accelerated by transferring *Mirage F1C*'s from existing French contracts. Subsequently, a number of Moroccan aircraft were modified to carry a reconnaissance pod developed with French assistance by Aero Maroc Industries.

The permanent F1CH/F1EH station is at Sidi Slimane, a former SAC base built during the 1950's, but two- to twelve-aircraft detachments are sent frequently to El Aioune in the Western Sahara for operations against the Polisario. Most combat operations are flown with a 1,200-liter ventral drop tank and four bombs on underwing racks, but widespread Polisario use of Soviet surface-to-air missiles necessitates the fitting of an ECM pod in place of one of the wingtip-mounted *Magic* air-to-air missiles as well as the installation of chaff- and flare-dispensers in the rear of the fuselage. In spite of these defensive measures, at least six of the ten *Mirage F1* losses prior to the end of 1984 occurred during combat operations; another combat loss was reported on January 10, 1985. Other *Mirage F1*'s have survived hits by automatic weapons and SAM's, with a *Mirage F1* known to have returned to base after losing parts of its fin and afterburner to an SA-7 *Grail* missile.

Qatar: Formed in 1968, the small Qatar Emiri Air Force operated only four combat aircraft (three single-seat and one two-seat, ex-Dutch, Hawker *Hunters*) when it ordered 12 *Mirage F1EDA*'s (serials QA 71 to QA 82) and two F1DDA two-seaters (QA 61 and QA 62) in 1981. These 14 aircraft were delivered between March, 1983, and July, 1984, and, equipping the Qatar Emiri Air Force's sole combat squadron, are based at the Doha International Airport.

South Africa: For many years, French conservative governments practiced a pragmatic policy toward the Republic of South Africa and, in so doing, opened for Dassault an attractive market for jet fighters. This policy, since reversed, has insured that for years to come *Mirage III*'s and *Mirage F1*'s will be the most important combat aircraft of the South African Air Force (SAAF).

Deliveries of 16 *Mirage F1CZ* interceptors (serials 200 to 215) began in September, 1974, and were completed in July, 1975, to permit the conversion of No. 3 Squadron at AFB Waterkloof. Thirty-two *Mirage F1AZ*'s (216 to 247) followed between November, 1975, and October, 1976, with this version also being assigned to No. 3 Squadron at AFB Waterkloof. In January, 1981, this squadron moved to AFB Hoedspruit. Since entering SAAF service, both versions have been used for peacetime training missions as well as retaliatory strikes against insurgents and Cuban-backed forces in Namibia.

South Africa, cut off from its French and other foreign suppliers since a United Nations Security Council resolution of November 4, 1977, prohibited arms sales, has had to rely on the Armaments Corporation of South Africa Ltd. (Armscor) for most of its needs. It is not known whether or not Atlas Aircraft Corporation, Armscor's aircraft manufacturing entity, has yet been able to avail itself of the *Mirage F1* manufacturing license acquired from Dassault in 1971; however, the likelihood of such manufacturing actually taking place is considered well within South African capabilities. What is known is that other Armscor companies have developed and are producing *Hide* chaff/infrared decoy-flare dispensers, which are carried by SAAF *Mirage F1*'s, and a new air-to-air missile. This infrared-homing missile, the V3B *Kukri*, uses a

helmet sighting system allowing off boresight target designation by the pilot; a still more advanced, all-aspect, version of the *Kukri* is expected to be operational in the near future.

Spain: Following protracted negotiations, during which the number of aircraft to be procured changed repeatedly, Spain ordered an initial batch of 15 *Mirage F1CE*'s. Given the designation C.14A and the serials C.14A-1 to C.14A-15 by the *Ejército del Aire* (Spanish Air Force), these aircraft were assigned to *Escuadrón 141, Ala de Caza 14* (141st Squadron, 14th Fighter Wing) based at Albacete-Los Llanos. Additional orders for 30 F1CE's (serials C.14A-16 to C.14A-25, and C.14A-32 to C.14A-51, including an aircraft to replace one lost prior to delivery) and six F1BE's (CE.14A-26 to CE.14-31) enabled the formation at the same base of a second squadron (*Escuadrón 142*) within *Ala de Caza 14*. The final Spanish order was for 22 F1EE's (C.14B-52 to C.14B-73) to equip an air defense squadron (*Escuadrón 462, Ala 46, Mando Aéro de Canarias*) at Gando in the Canary Island. At the beginning of 1985, 68 *Mirage F1*'s remained in Spanish service.

Strangely enough, the F1CE/C.14A interceptors of *Ala 14* spend 40 percent of their time training for ground attack missions whereas the multi-role F1EE/C.14B's of *Escuadrón 462* are used exclusively for air defense.

CONSTRUCTION AND SYSTEMS:[2]

The *Mirage F1C* is a single-seat, multi-mission, supersonic fighter of all-metal construction. Its primary missions are interception and air superiority, and its secondary mission is close air support.

The fuselage has a conventional semi-monocoque structure, with integrally-machined primary frames and chemically-milled secondary frames and fuel tank panels. Electrical spot welding is used for the secondary stringers and sealed panels, while the remainder of the structure is titanium flush riveted or bolted and sealed. Forward of the cockpit, the composite nose cone contains the *Cyrano IV* radar under a sharply pointed, removable, plastic radome. The single-seat cockpit has a clamshell canopy. The ejection seat is a Martin Baker Mk. 4, built under license by SEMMB; the improved Mk. 10 seat, with zero-zero capability, is fitted to some export aircraft, the F1CR's, and all two-seaters. Engine air intakes, with a movable semi-conical center-body, are located on each side of the fuselage aft of the cockpit. Space is available between these intakes for the aft-retracting Messier-Hispano twin-wheeled nose gear. Also twin-wheeled and manufactured by the same specialized company, the main gear units retract upward into the rear of the intake duct fairings. The nose wheels are fitted with Dunlop tires size 360 x 135, whereas the Dunlop tires for the main gear are 605 x 155. Two hydraulically-operated air brakes are mounted flush beneath the forward section of the intake ducts. For external stores carriage, hardpoints are built in to the bottom of the fuselage. A drag chute is housed in a fairing at the base of the vertical fin, just below the rudder; however, it is known that a number of French *Mirage F1C*'s have had ECM equipment fitted in this housing in place of the drag chute. Engine changes can be performed easily by removing only the extreme rear section of the fuselage and sliding the *Atar 9K50* onto a specialized self-elevating dolly.

The all-metal wings are shoulder-mounted and have a multi-spar structure (two main spars and four auxiliary spars). Sweepback is 47° 30' on the leading edge and anhedral is 5° from the root. On their trailing edge, the wings are fitted with double-slotted flaps and ailerons; additional control is provided by two spoilers on each wing, ahead of the flaps. On their leading edge, the wings have hydraulically-operated slats which are manually controlled for take-off and landing but which operate automatically in combat. Each wing is provided with two underwing hardpoints and one wingtip missile shoe.

The swept vertical tail surfaces are of all-metal construction and consist of a single spar fin and single-piece rudder. Two ventral fins, which are canted outboard, are attached beneath the rear fuselage. The all-moving single-piece stabilator is mid-set on the fuselage and is actuated hydraulically by electric or manual control. The tailplane trailing edge panels are of honeycomb sandwich construction.

Armament and Electronics

Built-in armament consists of two 30-mm revolver-type DEFA 553 cannon mounted in the lower center fuselage with muzzles just aft and below the air intakes. An ammunition box containing 135 rounds is provided for each gun. The DEFA 553 cannon weighs 179 lb. (81 kg.) and its rate of fire is 1,300 rounds/minute.

For their primary air intercept/air superiority mission, the *Mirage F1C*'s carry both short- and medium-range air-to-air missiles. The former are Matra 550 *Magic* missiles which are fitted with a SAT infrared-homing head. With a length of 9 ft.-1/4 in. (2.75 m.) and a weight of 196 lb. (899 kg.), the *Magic* is reported to be effective at ranges from 650 ft. (200 m.) to 6. 2 miles (10 km.). Foreign customers have the option of substituting *Sidewinders* for the *Magics*. For medium-range combat, the *Mirage F1C*'s initially used the unsatisfactory Matra R 530 which could be fitted with either an infrared-homing head or semi-active radar guidance. In French service, these obsolete weapons were replaced beginning in 1979 by Matra Super 530F all-aspect missiles fitted with an EMD electro-magnetic homing head. With a length of 11 ft. 7-3/8 in. (3.54 m.) and a weight of 551 lb. (250 kg.), the Super 530F has a shoot-up, shoot-down capability against targets more than 25,500 ft. (9,000 m.) above or below the launch *Mirage F1C*.

For their secondary close air support mission, French *Mirage F1C*'s normally carry two Matra F-4 launchers with eighteen 2.68-in. (68-mm.) unguided rockets on Alkan 915 or 916 underwing racks. Moreover, the *Mirage F1* has been cleared for the carriage of a wide variety of other external stores, and foreign users are known to avail themselves of this operational flexibility. These external stores include 551-lb. (250-kg.) SAMP EU 2 and 882-lb. (400-kg.) SAMP T 200 conventional or parachute-retarded general purpose bombs, 882-lb. (400-kg.) laser-guided Matra LGB bombs, 430-lb. (195-kg.) Matra *Durandal* penetration bombs, 220-lb. (100-kg.) BAP 100 runway cratering bombs, 265-lb. (120-kg.) BAT 120 anti-armor bombs, *Belouga* cluster bombs (each containing 166 2.65-lb. (1.2 kg.) grenades), AS.30 command-guided or AS.30L laser-guided air-to-surface missiles, AS.37 *Martel* defense-suppression missiles, and 30-mm. gun pods. Weight limit for the pylon beneath the fuselage, which can be fitted with a multiple-store adapter, is 4,497 lb. (2,040 kg.); the inboard wing racks (one on each side) have a 2,800 lb. (1,270-kg.) limit, the outboard wing racks a 1,102-lb. (500-kg.) limit, and the wingtip missile pylon a limit of 280-lb. (127-kg.). Maximum external combat load is 9,920 lb. (4,500 kg.).

The Thomson-CSF *Cyrano IV* airborne radar provides air-to-air search, automatic tracking, interception and fire computations, dog-fight engagements, home-on-jam mode, and ground mapping. It is a monopulse, I/J-band set employing a cassegrain scanner. In the *Cyrano IV-1* configuration it has been upgraded to provide moving target indication (MTI) for limited look-down capability, while in the *Cyrano IV-2* configuration it is fitted with beam-sharpening for air-ground missions. Other major systems are an NRAI4A and a 3560J IFF equipment manufactured by LMT, one UHF and one UHF/VHF transceiver, a Socrat 6200 VOR/ILS, an LMT ARN52C Tacan, a SFENA 505 autopilot, and a CSF headup display.

Countermeasures equipment may include a Thomson-CSF BF passive radar warning receiver, as well as any type of active jammer currently in the French inventory such as the Thomson-CSF DB 3163 *Remora* or *Barracuda* jammer pods and the Matra *Phimat* or, later, *Sycomor* chaff/flare dispensers.

POWERPLANT:

The *Mirage F1C* is powered by a single SNECMA *Atar 9K50* axial-flow turbojet with modulated afterburner. Maximum sea level static thrust is 15,873 lb. (7,200 kg.) with full afterburner and 11,056 lb. (5,015 kg.) dry at 8,500 rpm. Corresponding fuel consumption rates are 1.96 lb./lb. th. in full afterburner and 0.97 lb./lb. th. at the maximum dry rating.

The *Atar 9K50* is a single-spool straight flow turbojet with a nine-stage axial flow all-steel compressor, annular combustion chambers, and a two-stage turbine. The turbine blades are cast and coated with refractory metal from the vapor phase. The intake section accommodates the accessory-drive system and the control and electronic equipment. An approach control system, which adjusts the power of the engine automatically by varying the nozzle area during the landing approach, enables the aircraft to maintain a constant air speed. Overall length is 19 ft. 6 in. (5.95 m.), maximum diameter is 40.2 in. (1.02 m.), and its installed weight is 3,487 lb. (1,582 kg.).

The *Mirage F1C* internal fuel system consists of 14 bladder tanks in each inner wing section, a main center fuselage tank, and tanks in the walls of the fuselage. Total internal capacity is 1,136 U.S. gallons (4,300 liters), and all tanks can be refueled in six minutes.

External tanks have a 317-U.S. gallon (1,200-liter) capacity and are carried either singly beneath the fuselage or dually, one beneath each wing. For ferrying purposes, foreign *Mirage F1C* customers also use a 581-U.S. gallon (2,200-liter) tank beneath the fuselage.

In the case of the *Mirage F1C-200*, a non-retractable flight refueling probe is bolted-on forward of the cockpit. The probe is canted to starboard to ease connection with the tanker's basket.

Fuel types are French equivalents of NATO F-40 (JP-4) and NATO F-44 (JP-5). The oil type corresponds to NATO 0-148.

[2] As neither AMD-BA nor its suppliers or customers release flight and maintenance manuals on their current types, the following technical description is, per force, not to the same standard of detail as the descriptions appearing in other volumes of the **Aerofax Minigraph** series. None the less, we have striven to present herein a fairly complete and accurate description of the aircraft.

René Francillon collection

"Mirage F1C", 30-FL, of E.C. 3/30 "Lorraine" at the Solenzara air base (B.A. 126). An electrical system power cart is attached to the aircraft for start-up. Markings are standard for type.

René Francillon collection

"Mirage F1C-200", 5-NQ, of E.C. 1/5 "Vendée". This aircraft is equipped with RHAW antennas on the vertical fin and wingtip rails for transport of the "Magic" AAM. Some export "F1's" are equipped for "Sidewinder's" rather than "Magic's".

Roger Wright

"Mirage F1C", 5-NE, of E.C. 1/5 "Vendée". This view provides details of the small under-fuselage auxiliary intake doors, the leading edge flaps, and the split trailing edge flaps and flaperons.

Michel Fournier

"Mirage F1C-200", 5-NR, of E.C. 1/5 "Vendée", during August, 1984. A fuel/oil drain funnel and tank are seen pushed against the aft fuselage just under the national insigne. Unit marking is visible on the vertical fin.

SPECIFICATIONS AND PERFORMANCE:

The following data apply specifically to the *Mirage F1C* variant and are presented first in the English unit with the original metric system equivalents given in parentheses.

Fuselage length	49'2.6"	(15.00 m.)
Wingspan	27'6.7"	(8.40 m.)
Wing area	269.1 sq'	(25.00 m²)
Height	14'9.2"	(4.50 m.)
Wheel track	8'2.4"	(2.50 m.)
Wheelbase	15'10.9"	(4.85 m.)
Empty weight	16,755 lb.	(7,600 kg.)
T.O. weight (clean)	24,030 lb.	(10,900 kg.)
T.O. weight for interception sortie (two Matra 550's and two Matra Super 530's)	25,355 lb.	(11,500 kg.)
Max T-O weight	32,850 lb.	(14,900 kg.)
Max wing loading	122.1 lb./sq'	(596 kg./m²)
Max power loading	2.07 lb./lb. st.	(2.07 kg./kg. st.)
Max speed at s.l.	914 mph Mach 1.2	(1,470 km/h)
Max speed at 39,370' (12,000 m.)	1,451 mph Mach 2.2	(2,335 km/h)
Cruising speed at 29,530' (9,000 m.)	550 mph	(885 km/h)
Approach speed	162 mph	(260 km/h)
Landing speed	143 mph	(230 km/h)
Max initial rate of climb	41,930'/min.	(213 m./sec.)
Max rate of climb above 32,810' (10,000 m.)	47,835'/min.	(243 m./sec.
Stabilized supersonic ceiling	60,700'	(18,500 m.)
Service ceiling	65,615'	(20,000 m.)
Combat radius (with four missiles)	220 mi.	(350 km.)
Ferry range (w/three drop tanks)	1,490 mi.	(2,400 km.)
Take-off run (with four missiles)	2,100'	(640 m.)
Typical landing run	2,000'	(610 m.)

AVAILABLE SCALE MODELS AND DECALS:

The following is a complete listing of all known *Mirage F1* kits and decals:

Kits

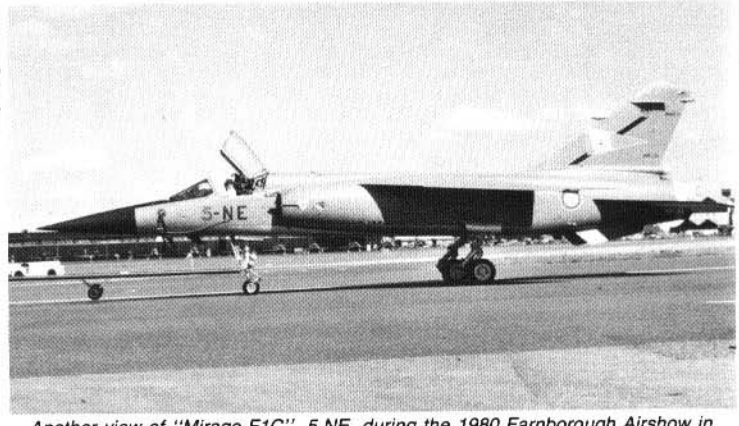
Airfix: 1/72nd (F1C)
Crown: 1/144th (F1C)
Esci: 1/48th (F1C-200/F1AZ)
Hasegawa: 1/72nd (F1C/F1C-200)
Heller: 1/72nd (F1B/F1C/F1CR)
Revell: 1/144th (F1C)

Decals

Modeldecal: 1/72nd — Nos. 45 and 69

Christian Boisselon

"Mirage F1C-200", 5-NP, of E.C. 1/5 "Vendée", during June, 1980. This aircraft is equipped with a pair of MATRA "Magic" AAM training rounds on its wingtip rails. 5-NP is the 207th production "Mirage F1".



Chris Pocock

Another view of "Mirage F1C", 5-NE, during the 1980 Farnborough Airshow in England. This aircraft bore standard markings for type, including E.C. 1/5 vertical fin art and identification call letters on the fuselage side just under the cockpit.

René Francillon collection

"Mirage F1C", 5-NJ, of E.C. 1/5 "Vendée", at the Solenzara air base (B.A. 126). It is carrying a MATRA R 530 infra-red guided AAM on its starboard wing pylon. The distinctive E.C. 1/5 vertical fin art is readily apparent.

Christian Boisselon

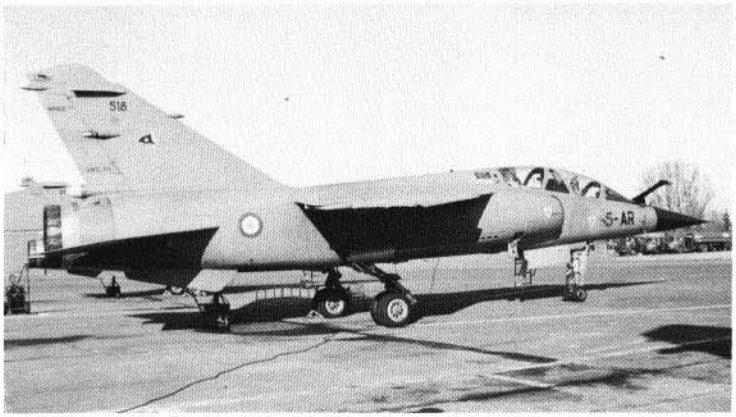
"Mirage F1C-200", 5-OO, of E.C. 2/5 "Ile de France". This is the 268th production "Mirage F1". Markings are standard for the type in "Armée de l'Air" service; its production number is discernible near the top of the vertical fin.

René Francillon collection

''Mirage F1C'', 5-OJ (aircraft no. 68), of E.C. 2/5 ''Ile de France'', seen at the Solenzara air base (B.A. 126). The vertical fin tip marking, '1941', is noteworthy as it signifies E.C. 2/5's initial involvement in WWII.

René Francillon collection

''Mirage F1C-200'', though like a/c no. 68 also assigned the aircraft identification code 5-OJ, and assigned to E.C. 2/5 ''Ille de France'' at Solenzara, is actually ''F1'' no. 208. This aircraft has AAM rails on its wingtips.

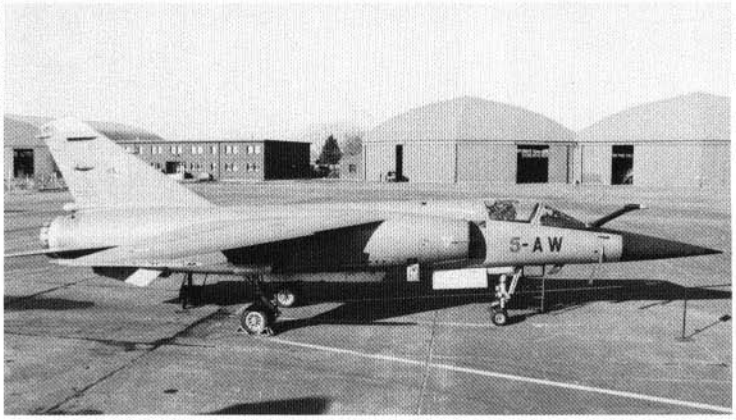


René Francillon collection

''Mirage F1B'', 5-AR, of E.C. 3/5 ''Comtat-Venaissin''. This unit, consisting of ERC 571 and SPA 171, acts as an operational training unit and is equipped with both ''F1C's'' and ''F1B's''. Note the inflight refueling probe.

René Francillon collection

''Mirage F1C'', 5-AU, of E.C. 3/5 ''Comtat-Venaissin''. Like 5-AR, this aircraft is part of the E.C. 3/5 inventory used primarily for operational training and evaluation.



René Francillon collection

''Mirage F1C'', 5-AW, of E.C. 3/5 ''Comtat-Venaissin''. Also assigned for use primarily as an operational training and evaluation aircraft. Like other E.C. 3/5 ''F1's'', it remains combat capable and is fully equipped.

René Francillon collection

''Mirage F1C'', 10-SC, of E.C. 1/10 ''Valois'', is seen moments before touching down at the Solanzara air base. Worthy of note are the lowered leading edge flaps, the lowered trailing edge flaps, and the aircraft's mild pitch attitude.

René Francillon collection

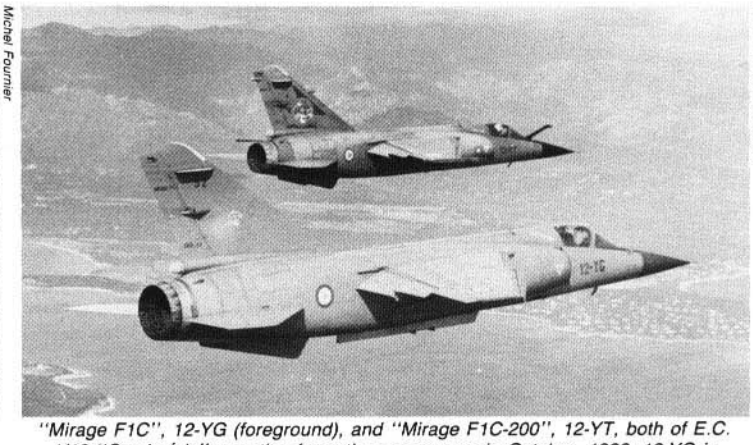
''Mirage F1C'', 10-SQ, of E.C. 1/10 ''Valois'', taxies out on a training mission from Solanzara air base. The aft-mounted store is a SECAPEM 90 target towing container attached to an ALKAN 910 centerline pylon.

Michel Fournier

''Mirage F1C'', 12-YC, of E.C. 1/12 ''Cambrésis'' during March, 1984. Markings are standard for type. Vertical fin badge of Escadrille SPA 89 is small. This was the 30th production ''Mirage F1''.

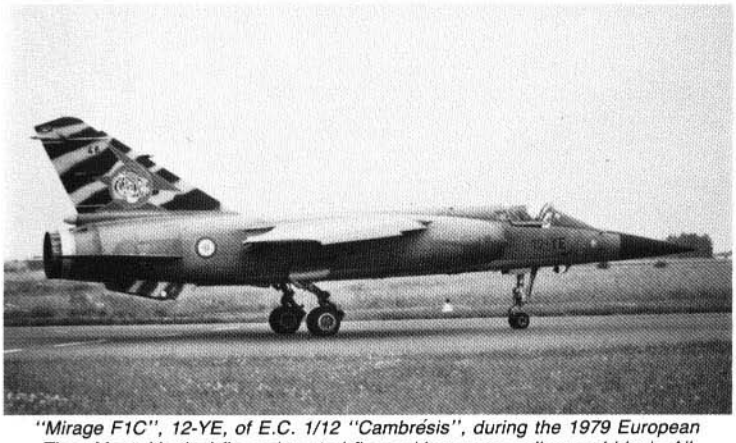
Michel Fournier

"Mirage F1C-200", 12-YI, of E.C. 1/12 "Cambrésis" during September, 1981, at Reims-Champagne air base. Unlike 12-YC, the SPA 89 vertical fin badge on this aircraft is quite large and readily visible.



René Francillon collection

"Mirage F1C", 12-YG (foreground), and "Mirage F1C-200", 12-YT, both of E.C. 1/12 "Cambrésis", practice formation maneuvers in October, 1983. 12-YG is flying with an ALKAN 910 centerline pylon, though no store is carried.



Aerofax, Inc. collection

"Mirage F1C", 12-YE, of E.C. 1/12 "Cambrésis", during the 1979 European Tiger Meet. Vertical fin and ventral fin markings were yellow and black. All other markings, including unit badge on vertical fin, were standard for type.

René Francillon collection

"Mirage F1C", 10-SW, of E.C. 1/30 "Valois". The 80th production "Mirage F1", it carries the French equivalent of an AIS (Aircraft Instrumentation Subsystem) pod. The AIS is part of a French ACMI system.

René Francillon

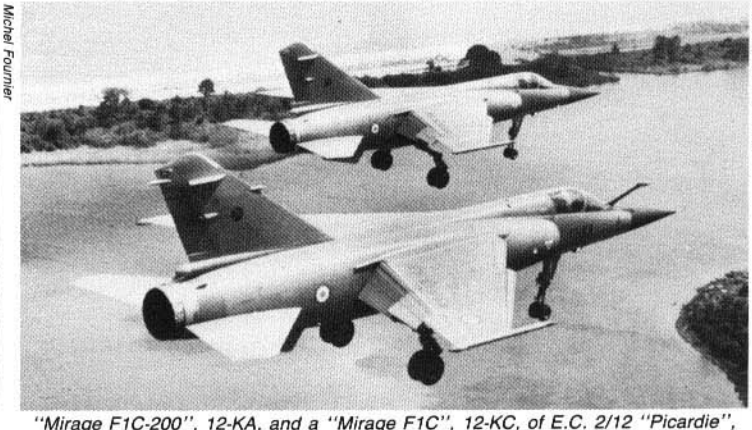
"Mirage F1C", 10-SU, of E.C. 1/10 "Valois". This is the 10th production "Mirage F1", and like 10-SW, it is carrying a telemetry pod on its right wingtip rail. an R 530 AAM is mounted on an ALKAN 910 centerline pylon.

René Francillon collection

"Mirage F1C", 10-SL, of E.C. 1/10 "Valois", prior to taxiing out on a training mission while carrying a MATRA "Super 530" AAM on its left wing pylon. The "Super 530" is a much improved development of the original R 530 AAM.

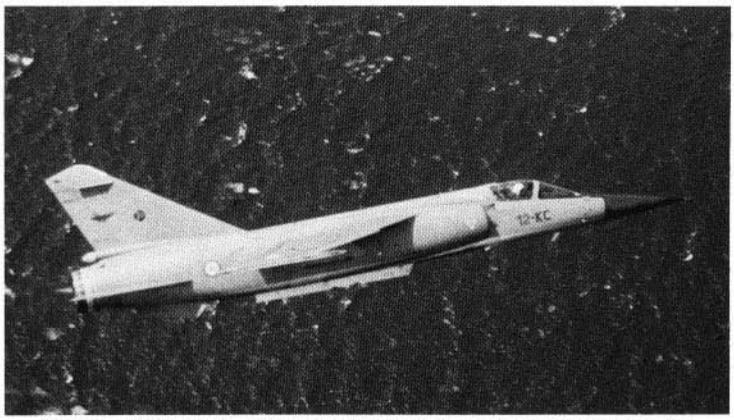
Michel Fournier

"Mirage F1C", 10-SA, of E.C. 1/10 "Valois", at the beginning of a training mission from Istres-le-Tubé (B.A. 125) in February, 1985. Mounted on the ALKAN 910 centerline pylon is a single MATRA R 530 AAM.



René Francillon collection

"Mirage F1C-200", 12-KA, and a "Mirage F1C", 12-KC, of E.C. 2/12 "Picardie", are seen on final approach over the Mediterranean Sea. Differential deployment of both flaps and flaperons is readily apparent.

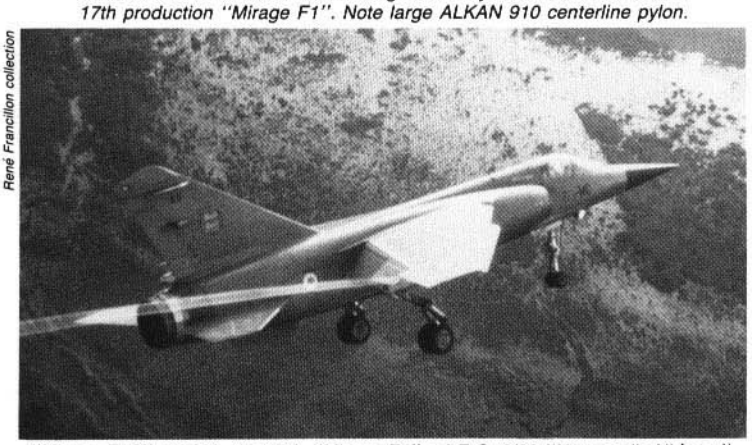


René Francillon collection

"Mirage F1C", 12-KC, of E.C. 2/12 "Picardie", during maneuvers over the Mediterranean Sea. Vertical fin badge is barely visible. 12-KC was the 17th production "Mirage F1". Note large ALKAN 910 centerline pylon.

MATRA via Patrick Bigel

"Mirage F1C's", 12-KN and 12-KG, of E.C. 1/12 "Picardie". Both aircraft are armed with MATRA "Super 530 F" AAM's on their wing pylons and MATRA 550 "Magic" AAM's on their wingtip rails.



René Francillon collection

"Mirage F1C", 30-MA, the 69th "Mirage F1", of E.C. 2/30 "Normandie-Niéman", crossing the coast of Corsica while turning on final approach to the Solenzara air base (B.A. 126). A visible vortex is being generated by the right wing.

Patrick Bigel

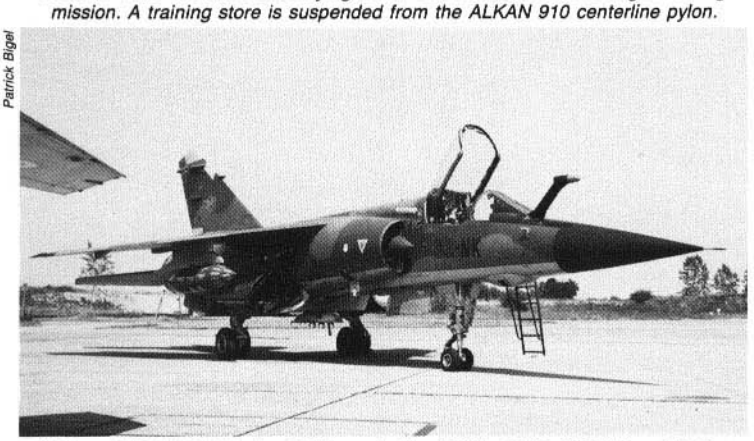
"Mirage F1C-200", 30-MU, the 262nd production "Mirage F1", of E.C. 2/30 "Normandie-Niéman". A MATRA R 530 AAM is suspended from the ALKAN 910 centerline pylon. Most R 530's are painted white with a silver or grey nose cone.

René Francillon collection

"Mirage F1C", 30-MO, the 43rd production "F1", of E.C. 2/30 "Normandie-Niéman". The aircraft is seen flying out of Solanzara air base during a training mission. A training store is suspended from the ALKAN 910 centerline pylon.

Patrick Bigel

"Mirage F1CR", 33-NA, the 603rd production "F1", of E.R. 2/33 "Savoie". The reconnaissance camera bay is located just ahead of the nose gear and is visible in the form of a ported fairing, or bump.

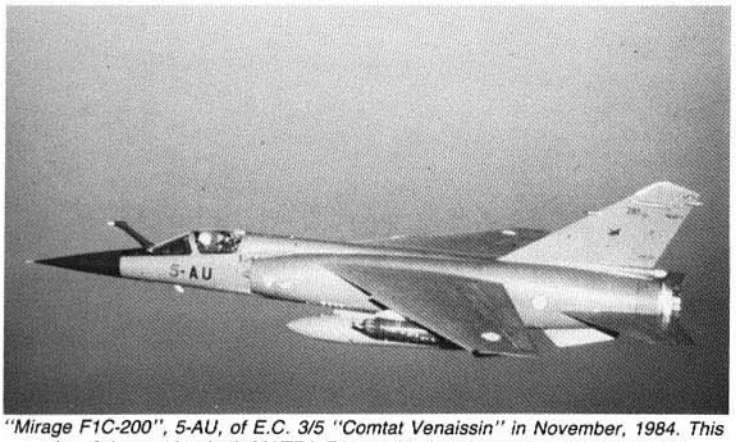


Patrick Bigel

"Mirage F1CR", 33-NK, the 613th production "F1", of E.R. 2/33 "Savoie". Two MATRA F4 unguided rocket pods are suspended from the wing pylons, verifying that the "F1CR" can be used for ground support work as well as recce.

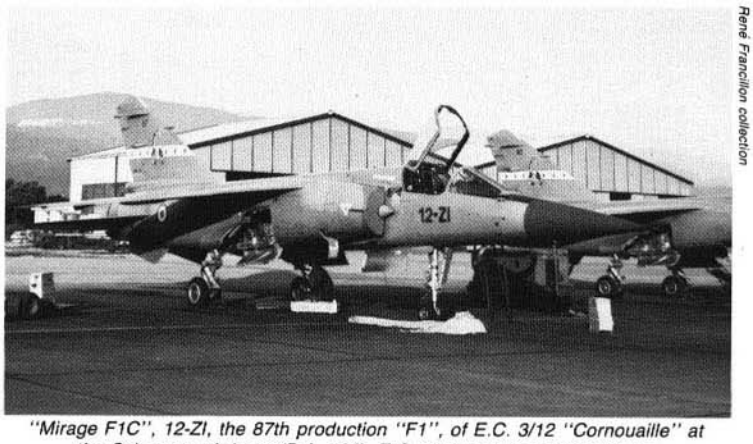
Patrick Bigel

"Mirage F1CR", 33-NN, the 616th production "F1", of E.R. 2/33 "Savoie", landing following a training sortie. The aircraft is equipped with a jettisonable 1,200 liter (317 gals.) external fuel tank under each wing.



René Francillon collection

"Mirage F1C-200", 5-AU, of E.C. 3/5 "Comtat Venaissin" in November, 1984. This aircraft is carrying both MATRA F4 unguided rocket pods and jettisonable 1,200 liter external wing tanks.

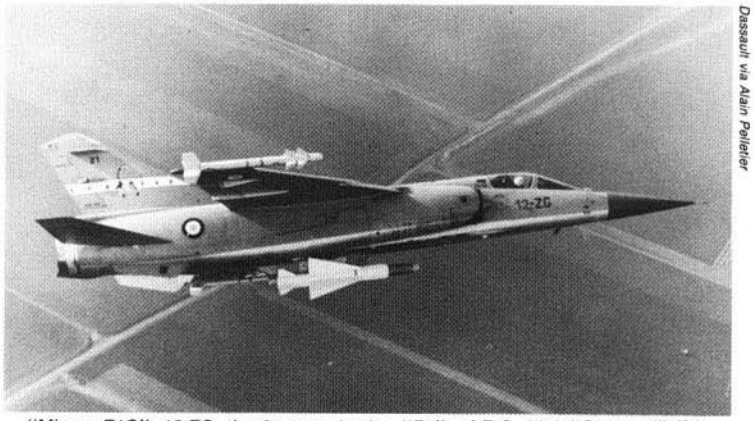


René Francillon collection

"Mirage F1C", 12-ZI, the 87th production "F1", of E.C. 3/12 "Cornouaille" at the Solenzara air base (B.A. 126). E.C. 3/12 was renumbered from the older E.C. 2/12 unit.

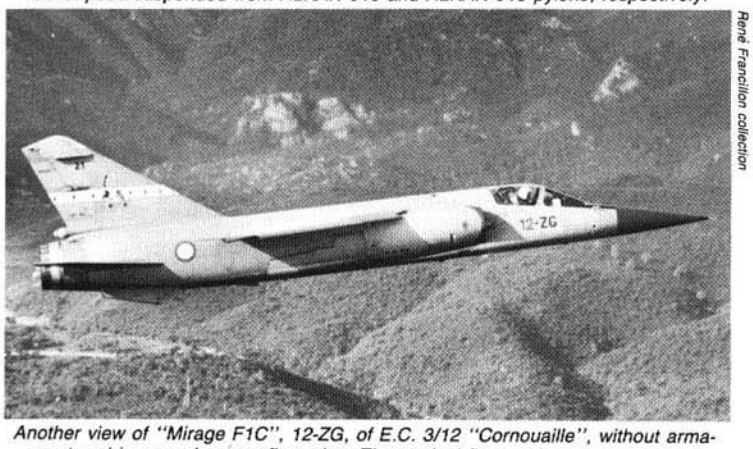
René Francillon collection

"Mirage F1C", 12-ZF, the 40th production "F1", of E.C. 3/12 "Cornouaille" has a single 1,200 liter centerline external fuel tank and two MATRA F4 unguided rocket pods suspended from ALKAN 910 and ALKAN 915 pylons, respectively.



Dassault via Alain Pelletier

"Mirage F1C", 12-ZG, the 21st production "F1", of E.C. 3/12 "Cornouaille" is equipped with MATRA R 550 "Magic" AAM's on its wingtip rails and a single MATRA R 530 AAM on its ALKAN 910 centerline pylon.



René Francillon collection

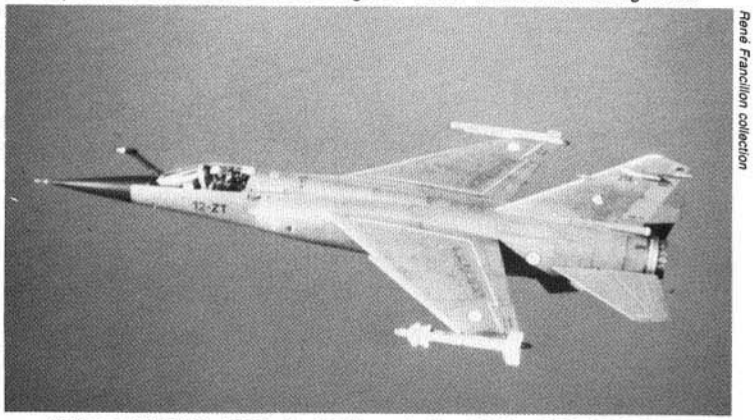
Another view of "Mirage F1C", 12-ZG, of E.C. 3/12 "Cornouaille", without armament and in very clean configuration. The vertical fin markings are prominent and all other markings are standard for type in "Armée de l'Air" service.

Michel Fournier

"Mirage F1C", 12-ZB, the 19th production "F1" of E.C. 3/12 "Cornouaille", during a transient stopover at the Cambrai-Epinoy air base (B.A. 103), in September, 1981. A McDonnell Douglas F-15A is visible in the background.

René Francillon collection

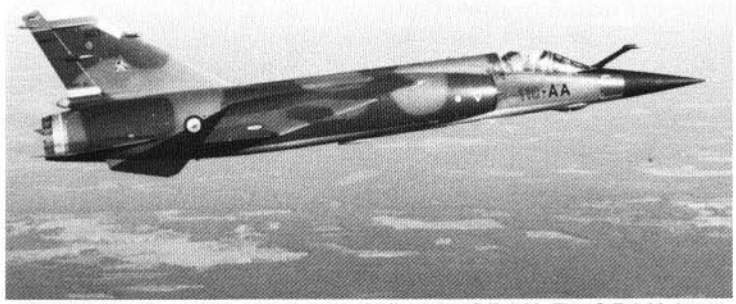
With its 1,200 liter centerline external tank seemingly dragging the taxiway, "Mirage F1C", 12-ZD, the 82nd production "F1", of E.C. 3/12 "Cornouaille", taxies out on a practice sortie from the Solenzara air base (B.A. 126).



René Francillon collection

"Mirage F1C-200", 12-ZT, the 254th production "F1", of E.C. 3/12 "Cornouaille", during a practice sortie with a MATRA R 550 "Magic" visible on the left wingtip rail, and a French AIS pod equivalent visible on the right

Alain Pelletier

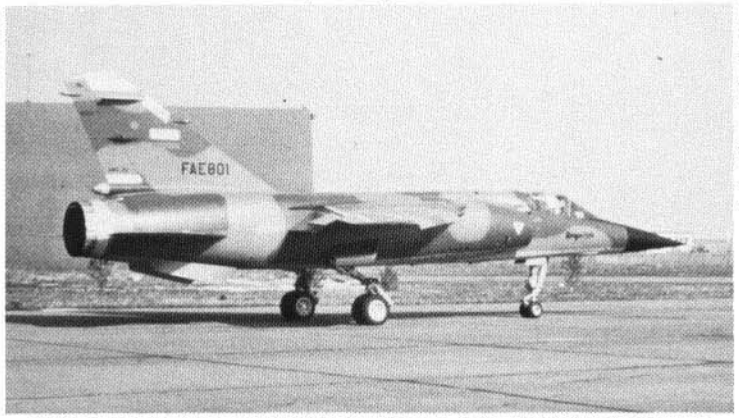


"Mirage F1CR", 118-AA, the third "F1CR", of the C.E.A.M. The C.E.A.M. is an operational test and evaluation unit similar in many respects to the USAF's 57th FWW. The C.E.A.M. helped verify the "F1CR's" recce capabilities.

Aerofax, Inc. collection

"Mirage F1C-200" of the C.E.A.M. Built as the first production "Mirage F1C", it later became the first aircraft brought up to the "F1C-200" standard. The C.E.A.M. operates several variants of the "Mirage F1".

Michel Fournier

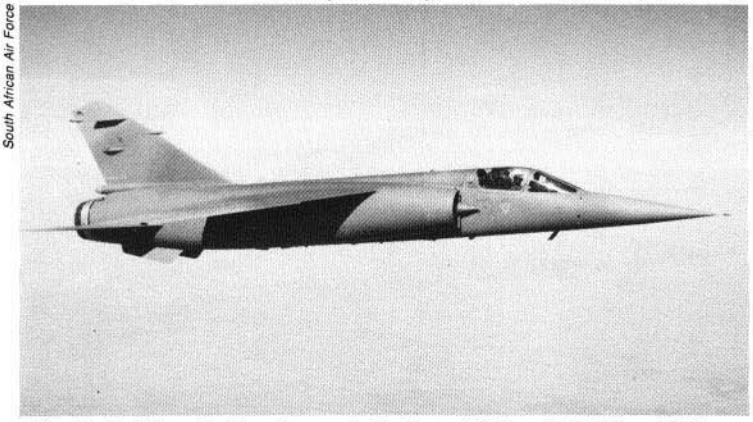


Deliveries of the "Mirage F1JA" to the "Fuerza Aerea Ecuatoriana" began in December, 1978. "Mirage F1JA", FAE 801, is seen just prior to delivery in January, 1979.

G. G. J. Kamp via Dan Hagedorn

The "Fuerza Aerea Ecuatoriana" has taken delivery of at least two "Mirage F1JE" two-seat trainers, including FAE 830, shown in March, 1979, shortly after its arrival. At least one of the two "F1JE's" has since been lost in an accident.

South African Air Force

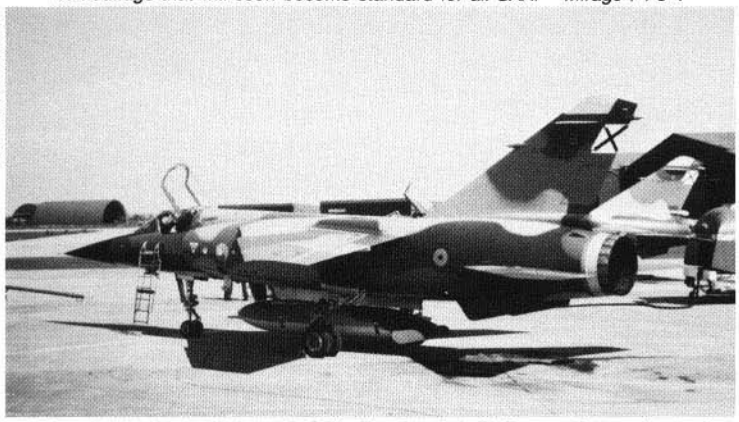


The South African Air Force has a sizable fleet of "Mirage F1AZ's" and "Mirage F1CZ's". An unidentified "Mirage F1CZ" is seen in the latest gray on gray camouflage that will soon become standard for all SAAF "Mirage F1's".

Dassault via Michel Fournier

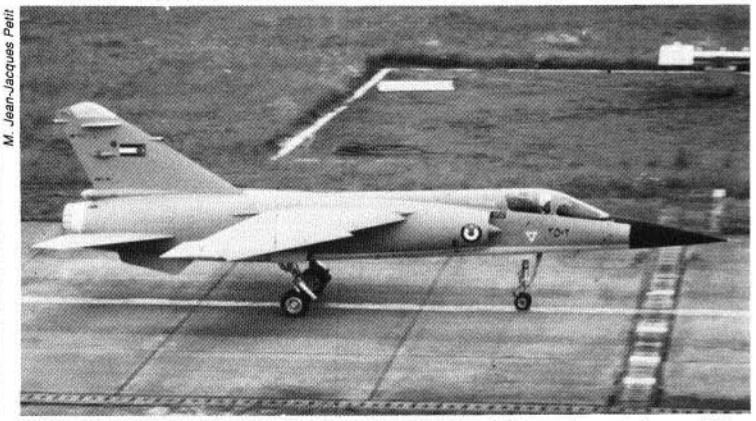
"Mirage F1CG", 110, of the Hellenic Air Force was one of 40 ordered from Dassault in June, 1974. The "F1CG" is basically similar to the "Armée de l'Air's" "F1C", but is modified to accommodate the AIM-9 "Sidewinder".

René Francillon collection

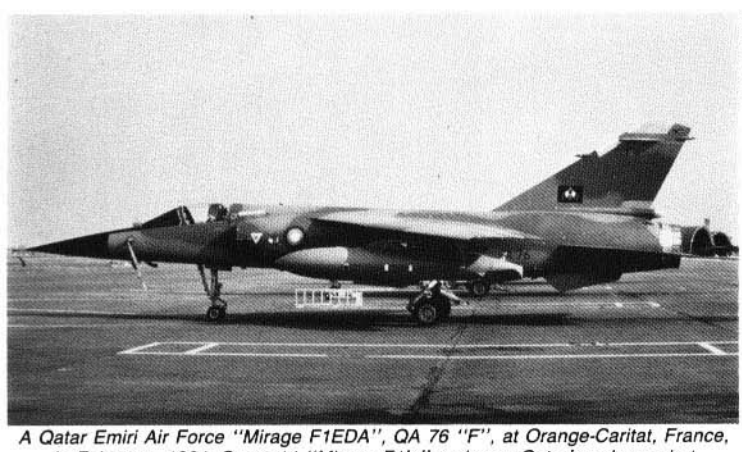


A Spanish Air Force "Mirage F1CE". The Spanish Air Force refers to these aircraft as C.14's, and has assigned each a suffixing serial number unique to that aircraft. This is C.14-20. Just over seventy "F1's" were acquired by Spain.

M. Jean-Jacques Petit

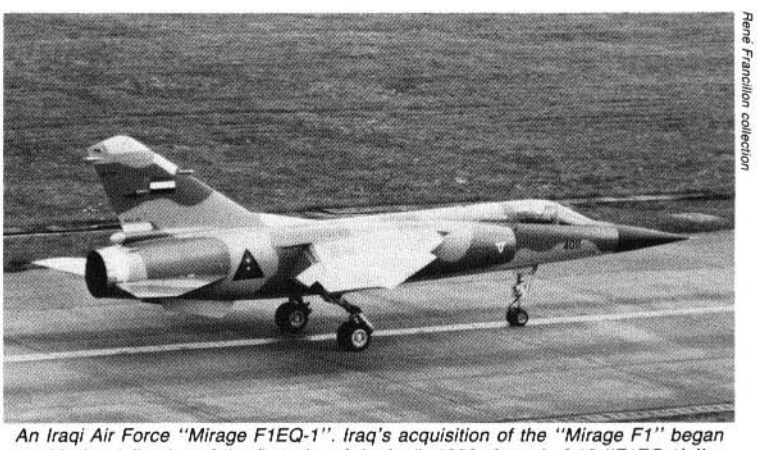


A Royal Jordanian Air Force "Mirage F1CJ" of No. 25 Squadron. Just over thirty "F1CJ's" are currently in the Royal Jordanian Air Force inventory. An additional 13 aircraft are expected to be acquired soon.



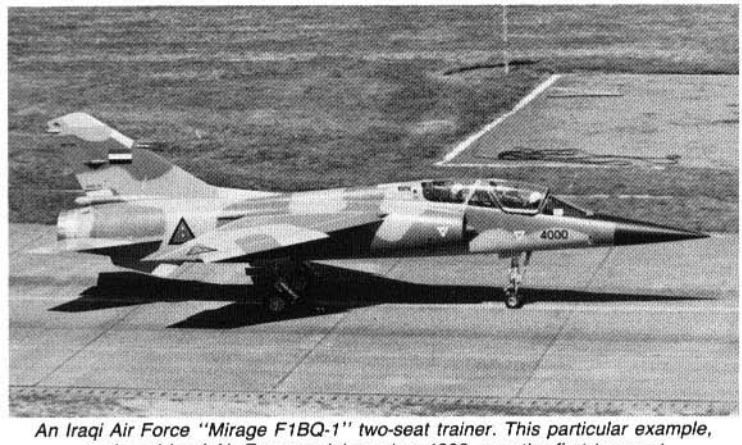
Michel Fournier

A Qatar Emiri Air Force "Mirage F1EDA", QA 76 "F", at Orange-Caritat, France, in February, 1984. Some 14 "Mirage F1's" make up Qatar's sole combat squadron. They are based at the Doha International Airport.



René Francillon collection

An Iraqi Air Force "Mirage F1EQ-1". Iraq's acquisition of the "Mirage F1" began with the deliveries of the first aircraft in April, 1980. A total of 18 "F1EQ-1's" were eventually ordered by the Iraqi Air Force.

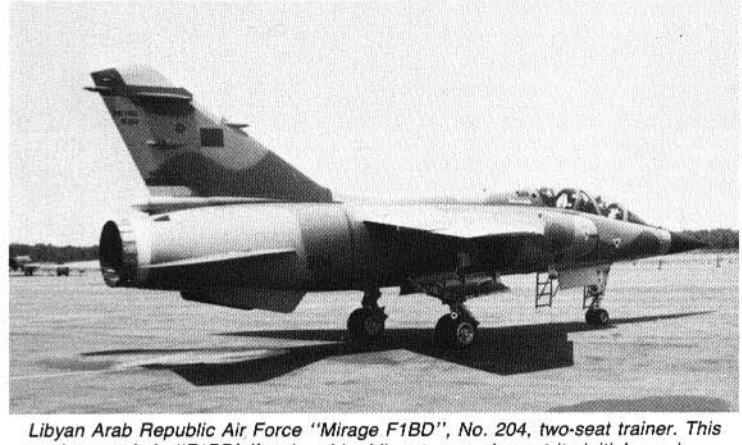


René Francillon collection

An Iraqi Air Force "Mirage F1BQ-1" two-seat trainer. This particular example, assigned Iraqi Air Force serial number 4000, was the first two-seat "Mirage F1" variant delivered to Iraq.

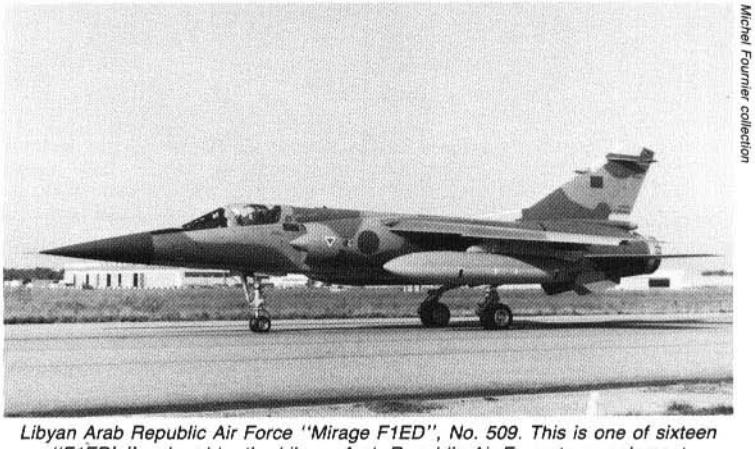
Michel Fournier collection

A Royal Moroccan Air Force "Mirage F1EH". "F1" deliveries to Morocco began in February, 1978. The type has been used extensively by the Royal Moroccan Air Force in actual combat with the Polisario Front.



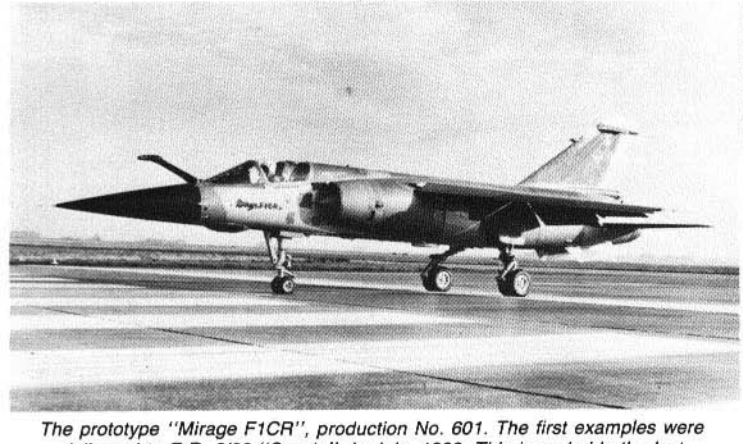
René Francillon collection

Libyan Arab Republic Air Force "Mirage F1BD", No. 204, two-seat trainer. This is one of six "F1BD's" ordered by Libya to complement its initial supply of 32 single-seat "F1's".



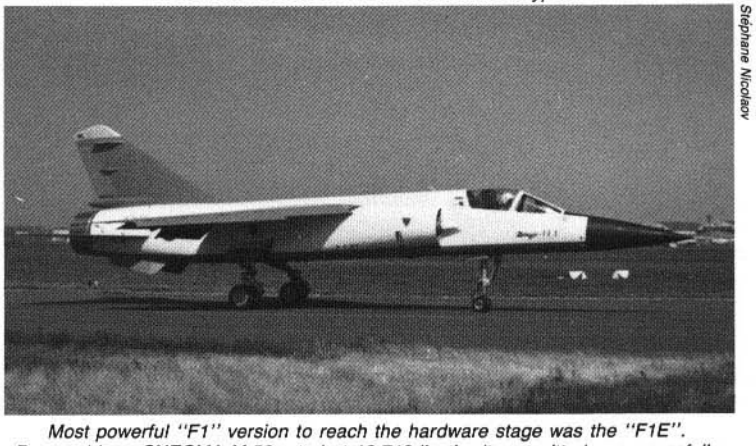
Michel Fournier collection

Libyan Arab Republic Air Force "Mirage F1ED", No. 509. This is one of sixteen "F1ED's" ordered by the Libyan Arab Republic Air Force to complement its rather extensive fleet of Soviet combat types.



Alain Pelletier collection

The prototype "Mirage F1CR", production No. 601. The first examples were delivered to E.R. 2/33 "Savoie", in July, 1983. This is probably the last production version of the "Mirage F1".



Stéphane Nicolaev

Most powerful "F1" version to reach the hardware stage was the "F1E". Powered by a SNECMA M.53 rated at 18,740 lb. th., it was pitted unsuccessfully against the YF-16 and YF-17 in what was billed as the "Deal of the Century".

Chris Pocock

The second prototype "Mirage F1", during its demonstration sessions at the 1969 Paris Airshow. The aircraft is in Dassault-applied markings with a test unit badge visible on the fuselage side, just below the cockpit.

Aerofax, Inc. collection

"Mirage F1C", 30-MF, of E.C. 2/30, "Normandie-Nieman". Markings, including blue/gray upper and white lower surfaces, were standard for type when photo was taken during May, 1976. Note unit patch on vertical fin.

Chris Pocock

"Mirage F1C-200", 5-OA, of E.C. 2/5 "Ile de France". All inflight refueling probes seen on "F1C-200" series aircraft are painted black in order to eliminate distracting glare.

John Kerr

"Mirage F1C", 12-YR, of E.C. 1/12 "Cambrésis" during a June, 1977, visit to England. The SPA 89 vertical fin patch is quite distinctive. All other markings are standard for type.

Christian Boisselon

"Mirage F1C-200", 5-NM, of E.C. 1/5 "Vendée". It is configured for final approach and is seen landing at an unidentified French base on June 15, 1980. Extended nose gear strut and landing light (just ahead of strut) are noteworthy.

Michel Fournier

"Mirage F1C-200", 5-OH, of E.C. 2/5 "Ile de France", during July, 1984. Markings are standard for type, with blue-gray upper surfaces and medium gray lower.

Christian Boisselon

"Mirage F1C-200", 5-OI, of E.C. 2/5 "Ile de France". It is seen shortly after lift-off with the landing gear in mid-retraction. The rotational geometry requirement of the main gear is noteworthy.

Christian Boisselon

"Mirage F1C-200", 5-AV, of E.C. 3/5 "Comtat Venaissin", during August, 1982. The diminutive insigne on the left side of the vertical fin is that of the squadron's second flight, SPA 171.

Michel Fournier

"Mirage F1C", 10-SB, of E.C. 1/10 "Valois". It is equipped with a single MATRA R 530 air-to-air missile on its centerline pylon, and the French equivalent of an AIS (Aircraft Instrumentation Subsystem) pod on its left wingtip rail.

Michel Fournier

"Mirage F1C", 10-SW, of E.C. 1/10 "Valois". The French equivalent of an AIS (Aircraft Instrumentation Subsystem) pod is seen on its right wingtip rail. The AIS is part of the ACMI (Air Combat Maneuvering Instrumentation) system.

Christian Boisselon

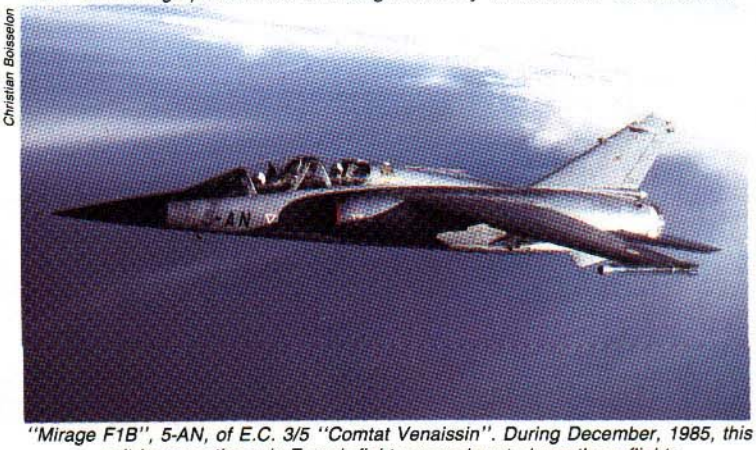
"Mirage F1C-200", 12-YO, of E.C. 1/12 "Cambrésis", during September, 1981. The E.C. 1/12 vertical fin markings are distinctive. All other markings are standard for type.

Michel Fournier

"Mirage F1CR", 33-NN, of E.R. 2/33 "Savoie", during August, 1985. This is one of the most recent "Mirage F1CR" deliveries and it bears the latest "Armée de l'Air" camouflage pattern. The unit badge is readily visible on the vertical tail fin.

René Francillon collection

"Mirage F1B", 118-AU, of the C.E.A.M. This aircraft later became 5-AM and was assigned to E.C. 3/5 "Comtat Venaissin". As part of the C.E.A.M. it was used as an air combat trainer and testbed.



Christian Boisselon

"Mirage F1B", 5-AN, of E.C. 3/5 "Comtat Venaissin". During December, 1985, this unit became the only French fighter squadron to have three flights (Escadrilles ERC 571, SPA 171, and SPA 62).

G.G.J. Kamp via Dan Hagedorn

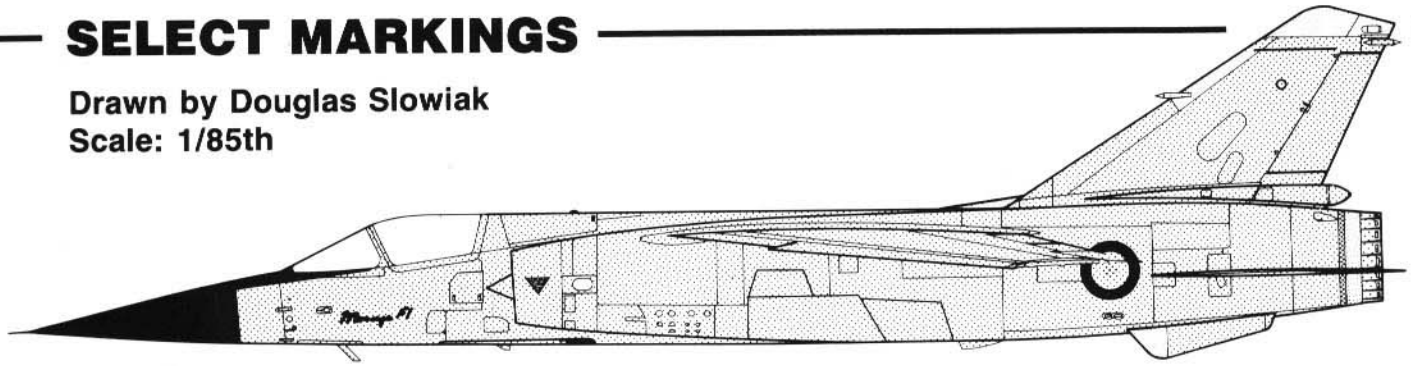
Camouflaged "Mirage F1JE", FAE 804, of Escuadrón de Combate 2110, Ala de Combate 21, of the "Fuerza Aérea Ecuatoriana", prior to delivery from France during March, 1979.

M. Critescu

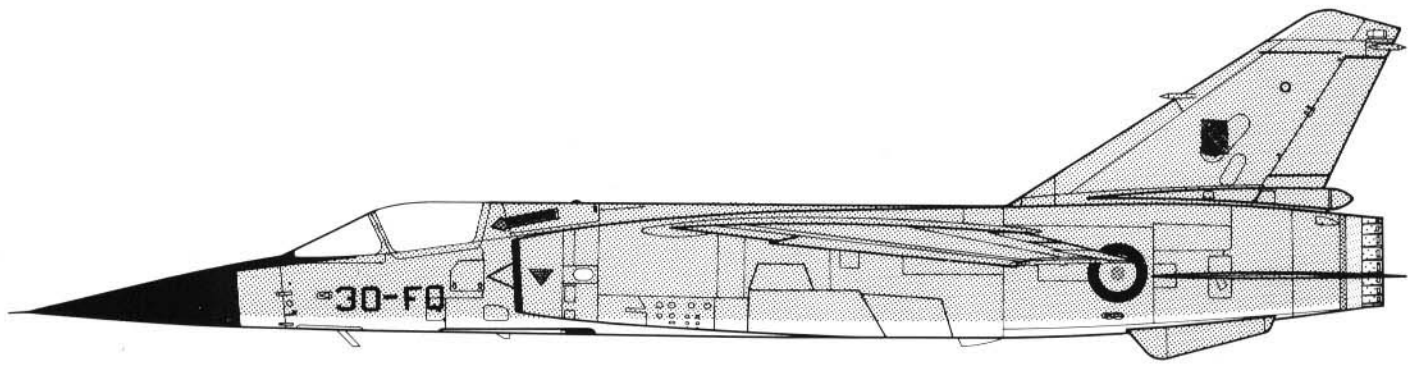
"Mirage F1CG", No. 109, of 114a Pterix Mahis, of the "Helliniki Aeroporia" (Greek Air Force), during August, 1975. It is equipped with a pair of 1,200 liter drop tanks.

SELECT MARKINGS

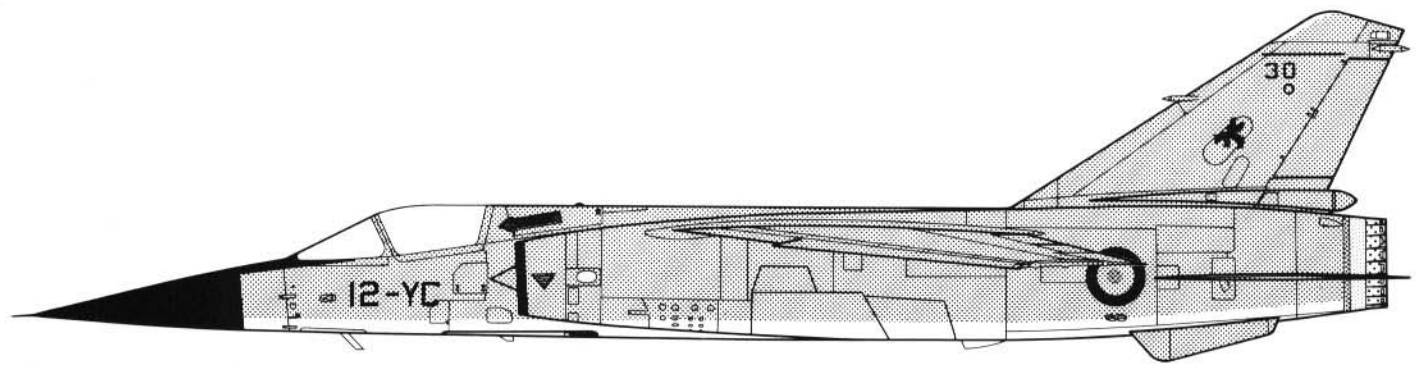
Drawn by Douglas Slowiak
Scale: 1/85th



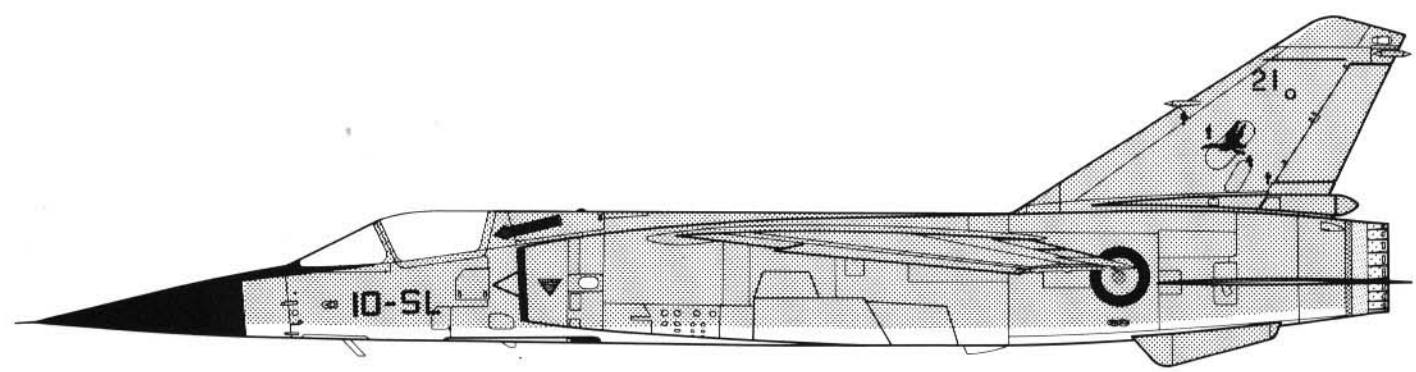
A "Mirage F1" in prototype markings. The "Mirage F1" logo is in black script on the nose, just under the canopy. The rest of the aircraft is in bare metal, with no other markings. The glare shield ahead of the windscreen has not been applied. The nose radome is black. The "Armée de l'Air" roundel is yellow, red, white, and blue.



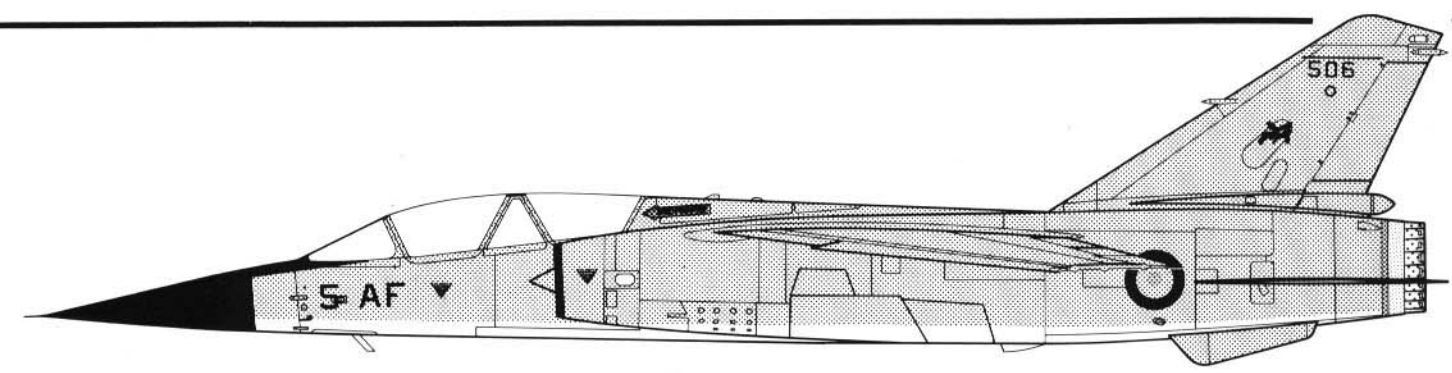
"Mirage F1C", 30-FQ, of E.C. 3/30 (note vertical fin patch) of the "Armée de l'Air". Markings shown are standard for type with silver undersurfaces (approx. FS 17178) and intermediate blue upper surfaces (approx. FS 35164). The "Armée de l'Air" roundel is yellow, red, white, and blue. The unit patch on the vertical fin is yellow with a red diagonal bar and white birds. All other lettering is black (the numbers on the nose are usually in "outline" type). The intake lip is trimmed in red (approx. FS 28913).



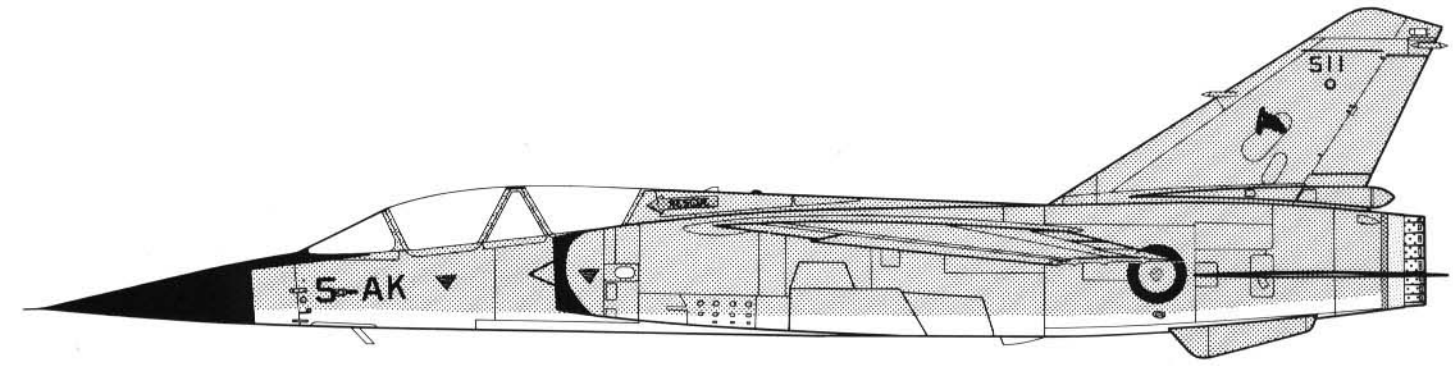
"Mirage F1C", 12-YC, of E.C. 1/12 "Cambrésis"/SPA 89 of the "Armée de l'Air". Markings shown are standard for type with silver undersurfaces (approx. FS 17178) and intermediate blue upper surfaces (approx. FS 35164). The "Armée de l'Air" roundel is yellow, red, white, and blue. The Escadrille patch (a bee) on the vertical fin is yellow (belly), black, and white (wings). All other lettering is black (the numbers on the nose are usually in "outline" type). The intake lip is trimmed in red (approx. FS 28913).



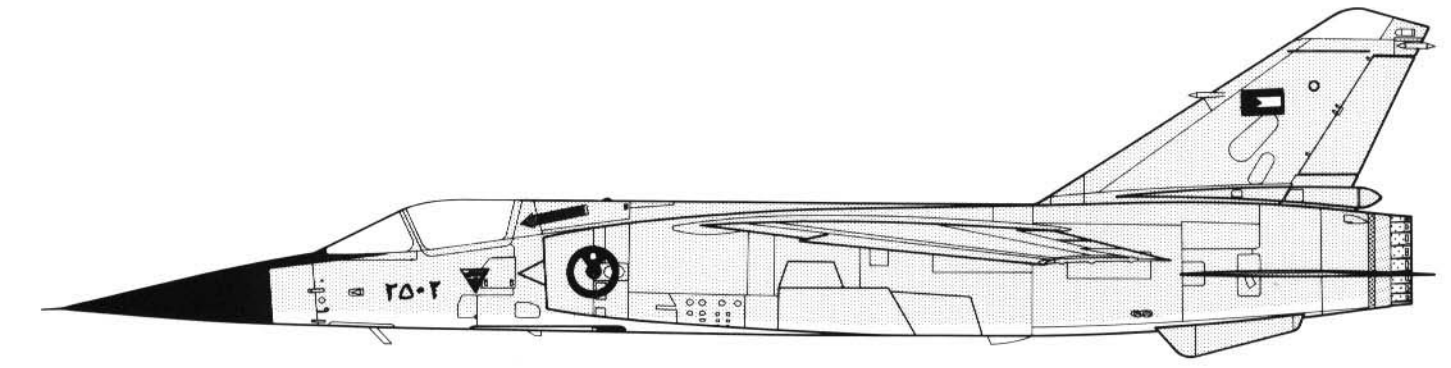
"Mirage F1C", 10-SL, of E.C. 1/10 "Valois"/SPA 84 of the "Armée de l'Air". Markings shown are standard for type with silver undersurfaces (approx. FS 17178) and intermediate blue upper surfaces (approx. FS 35164). The "Armée de l'Air" roundel is red, yellow, white, and blue. The Escadrille patch (a flying goose) on the vertical fin is black, yellow, and green. All other lettering is black (the numbers on the nose are usually in outline type). The intake is trimmed in red (approx. FS 28913).



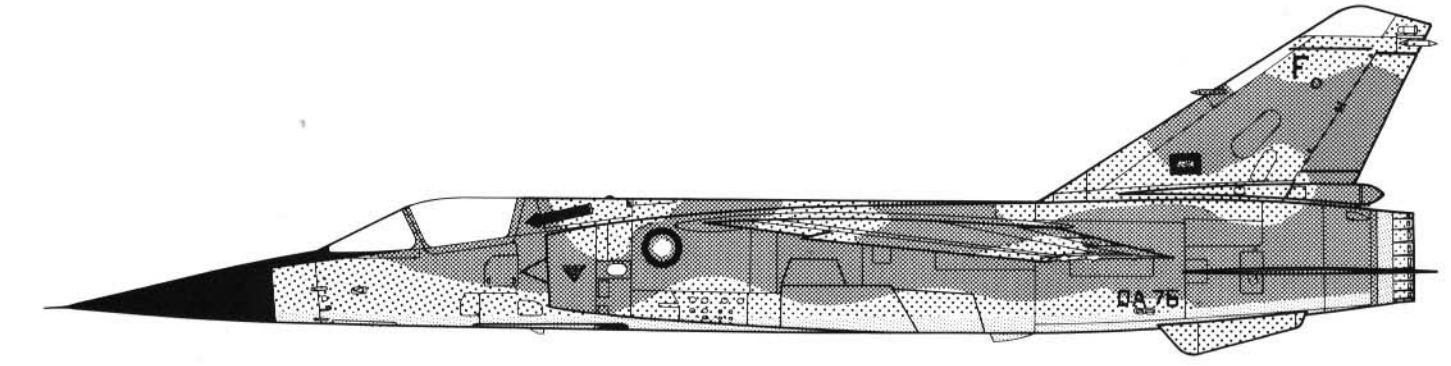
"Mirage F1B", 5-AF, of E.C. 3/5 "Comtat Venaissin"/SPA 171 of the "Armée de l'Air". Markings shown are standard for type, with silver undersurfaces (approx. FS 17178) and intermediate blue upper surfaces (approx. FS 35164). The "Armée de l'Air" roundel is yellow, red, white, and blue. The Escadrille patch (a griffon) on the vertical fin is black outlined in yellow. All other lettering is black (the numbers on the nose are usually in "outline" type). The intake lip is trimmed in red (approx. FS 28913).



"Mirage F1B", 5-AK, of E.C. 3/5 "Comtat-Venaissin"/ERC 571 of the "Armée de l'Air". Markings shown are standard for type with silver undersurfaces (approx. FS 17178) and intermediate blue upper surfaces (approx. FS 35164). The "Armée de l'Air" roundel is yellow, red, white, and blue. The Escadrille patch (a pirate flag) on the vertical fin is black and yellow. All other lettering is black (the numbers on the nose are usually in "outline" type). The intake lip is trimmed in red (approx. FS 28913).

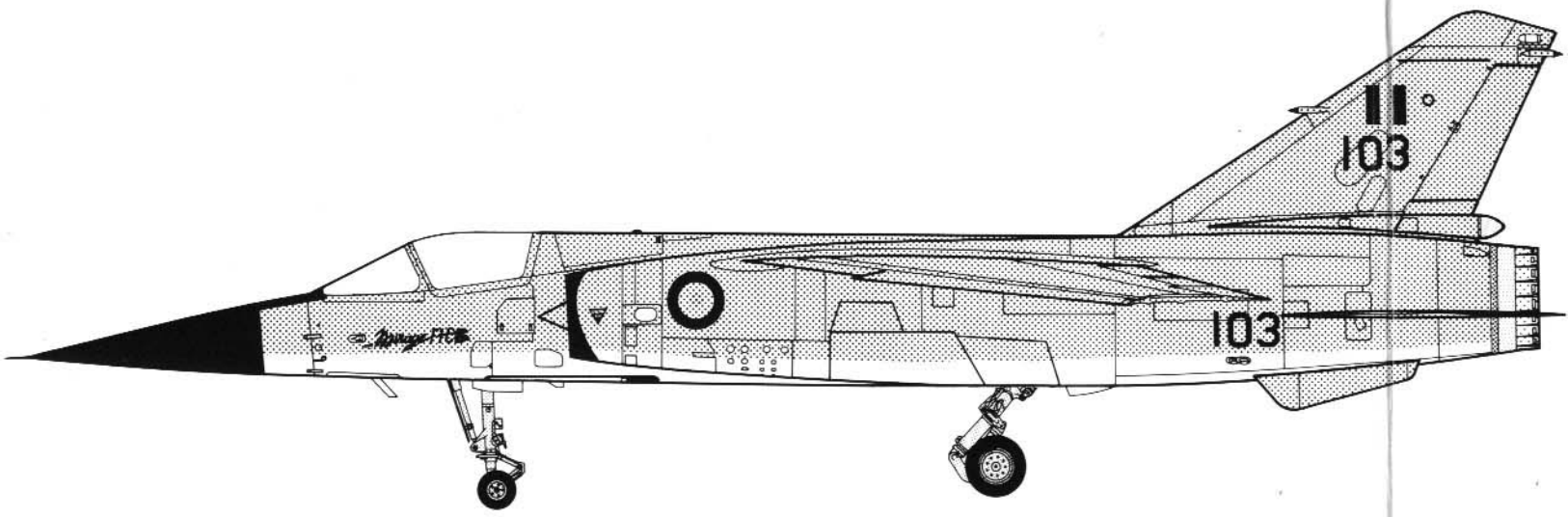


"Mirage F1CJ" of the Royal Jordanian Air Force. The upper surfaces are painted blue/gray overall (approx. FS 16473), with insignia white undersurfaces (approx. FS 17875). The Royal Jordanian Air Force roundel is black, white, and green, with a red pie slice cut from the top and a white six-pointed star thereon. The Jordanian flag on the vertical fin is also black, white, and green. All miscellaneous lettering is in black.

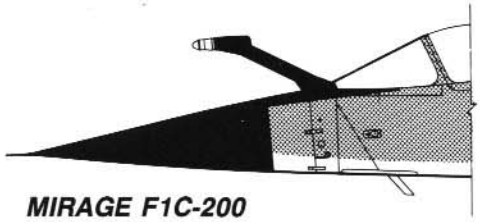


"Mirage F1EDA", QA 76, of the Qatar Emiri Air Force. The desert camouflage pattern consists of a medium tan (approx. FS 20400), and a darker brown along the lines of a desert drab color (approx. FS 30219). The undersurface is painted azure blue (approx. FS 35231). The Qatar Emiri Air Force roundel is red, tan, and white. The vertical fin patch is black with red, white, and gold crossed flags. All miscellaneous lettering is black.

DASSAULT *MIRAGE F1CG*, KEA/103

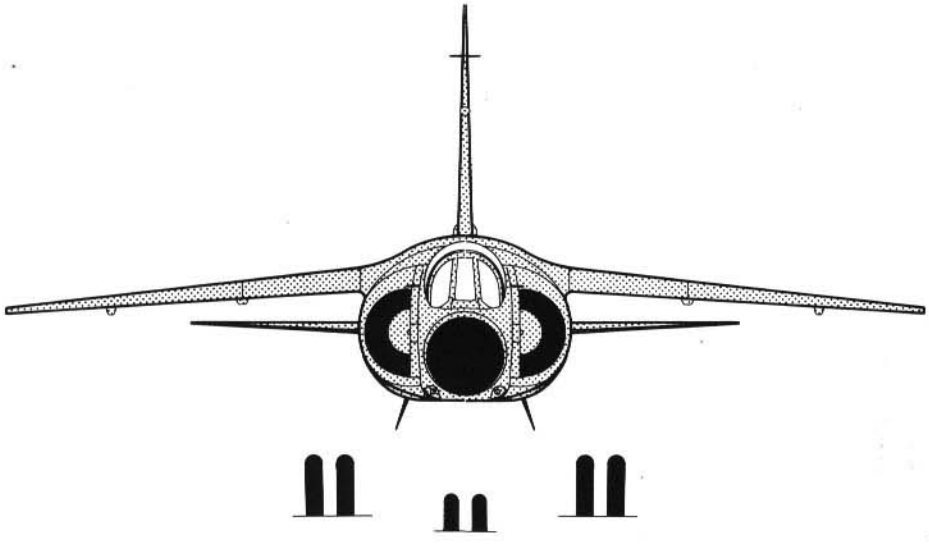


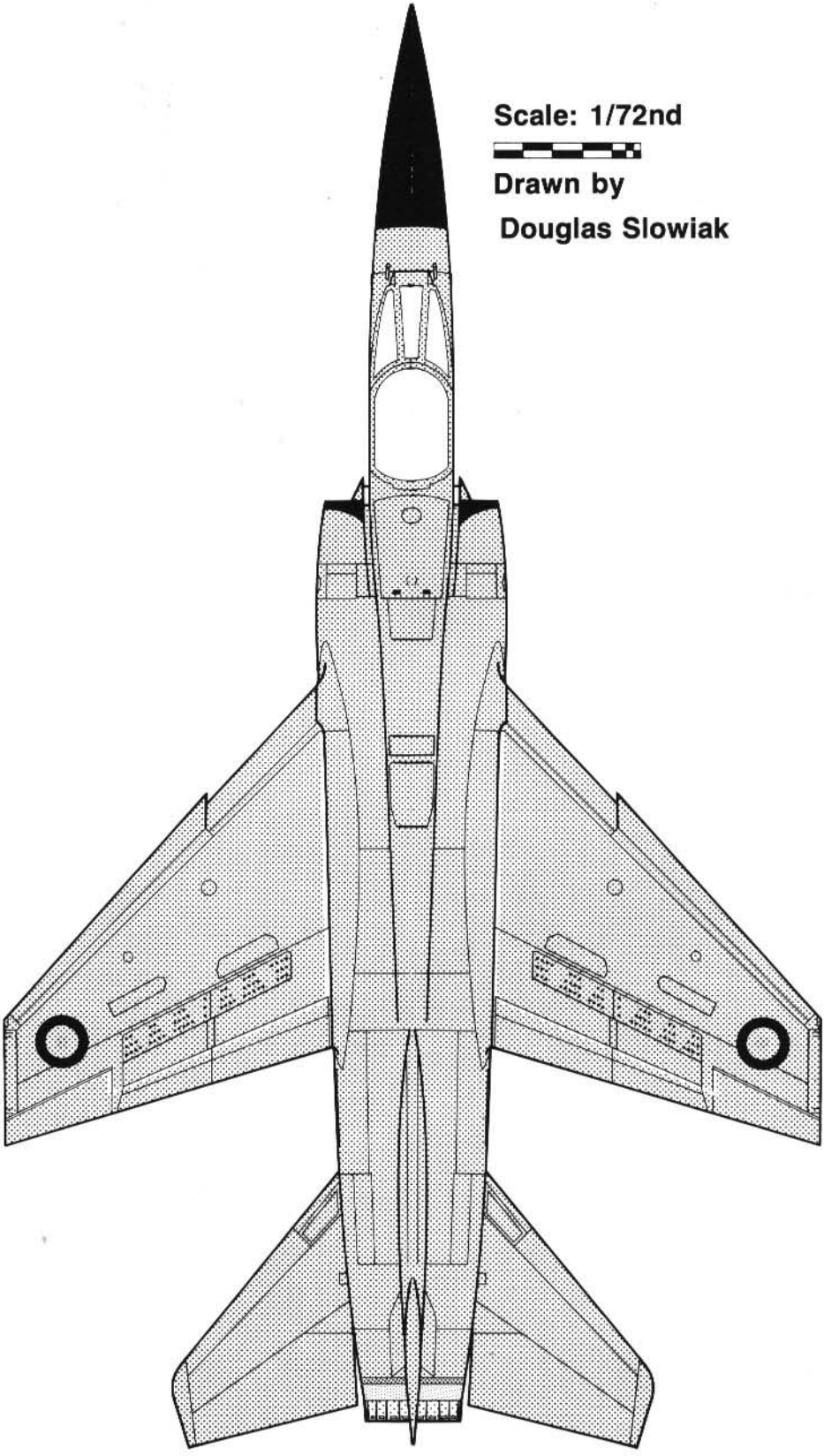
"Mirage F1CG", KEA/103, of the Greek Air Force. Markings as shown are standard for type with silver undersurfaces (approx. FS 17178) and intermediate blue upper surfaces (approx. FS 35164). The Greek Air Force roundel is blue/white/blue, as is the vertical fin ribbon. The numbers, miscellaneous markings, and radome are black. The intake lip is trimmed in red (approx. FS 28913). The "no walk" stripes visible on the upper surfaces of the wing are yellow/orange (approx. FS 13538).

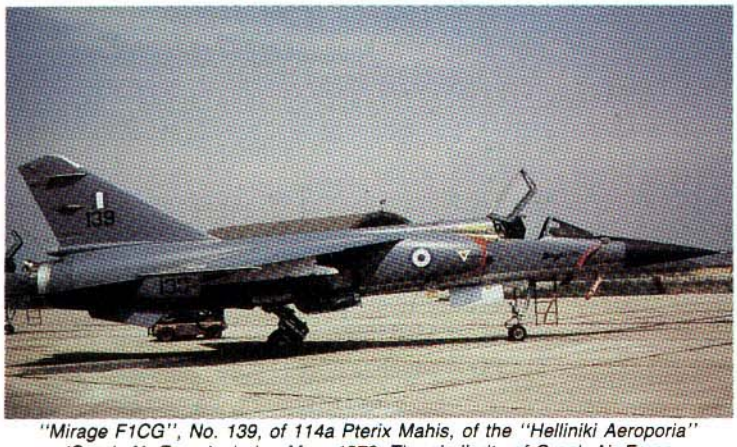


MIRAGE F1C-200

"Mirage F1BJ" of the Royal Jordanian Air Force. The upper surfaces are painted blue/gray overall (approx. FS 16473), with insignia white undersurfaces (approx. FS 17875). The Royal Jordanian Air Force roundel is black, white, and green, with a red pie slice cut from the top and white six-pointed star thereon. The Jordanian flag on the vertical fin is also black, white, and green. All miscellaneous lettering is in black.

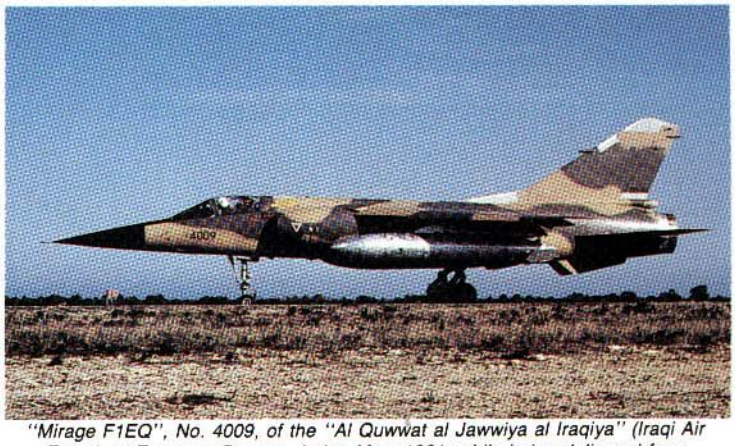



Scale: 1/72nd
Drawn by
Douglas Slowiak



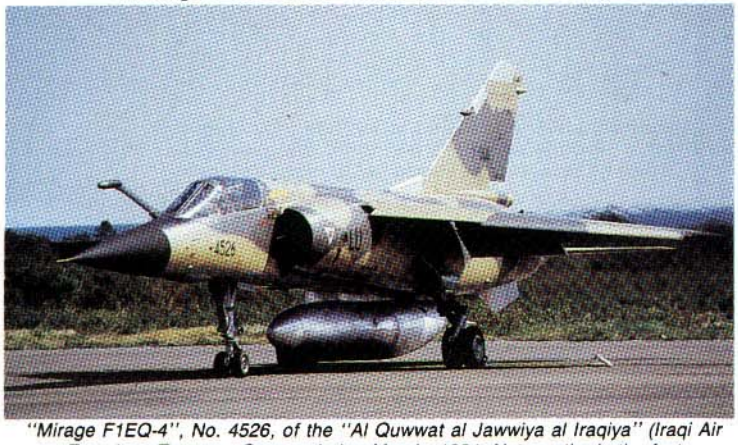
Michel Fournier

"Mirage F1CG", No. 139, of 114a Pterix Mahis, of the "Helliniki Aeroporia" (Greek Air Force), during May, 1979. The similarity of Greek Air Force markings to those of the "Armée de l'Air" is noteworthy.



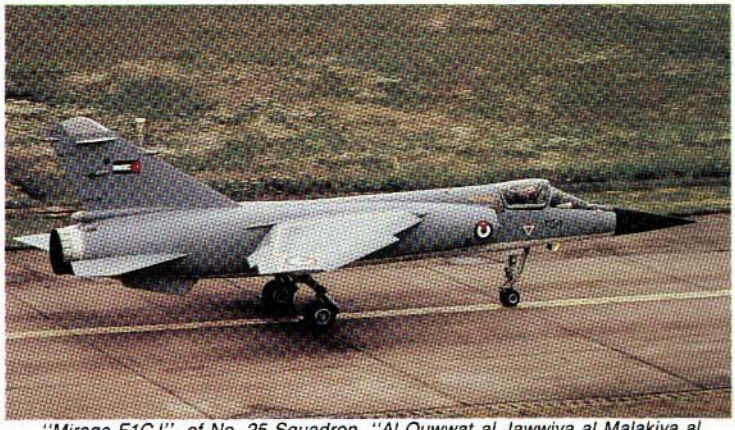
René Francillon collection

"Mirage F1EQ", No. 4009, of the "Al Quwwat al Jawwiya al Iraqiya" (Iraqi Air Force), at Tanagra, Greece, during May, 1981, while being delivered from France to Iraq. The 1,200 liter drop tanks are noteworthy.



René Francillon collection

"Mirage F1EQ-4", No. 4526, of the "Al Quwwat al Jawwiya al Iraqiya" (Iraqi Air Force), at Tanagra, Greece during March, 1984. Noteworthy is the fact that this aircraft bears the temporary civil registration, Y-IBLU.



René Francillon collection

"Mirage F1CJ", of No. 25 Squadron, "Al Quwwat al Jawwiya al Malakiya al Urdiniya" (Royal Jordanian Air Force). The light gray and white scheme of this aircraft is distinctive. Note the national insigne on the intake cheek.

René Francillon collection

Two "Mirage F1BK's" Nos. 771 and 772, of the "Al Quwwat al Jawwiya al Kuwaitiya" (Kuwait Air Force) at an unidentified base during November, 1977. Both aircraft are equipped with 1,200 liter drop tanks.

René Francillon collection

"Mirage F1EQ", No. 4567, of the "Al Quwwat al Jawwiya al Iraqiya" (Iraqi Air Force). It is seen with a long-range 2,200 liter centerline drop tank that is normally used only for long range ferry missions.

René Francillon collection

"Mirage F1EH-200", No. 172, of the Royal Moroccan Air Force during December, 1980. Markings are standard for RMAF aircraft. The wing warning stripes are noteworthy, as is the 1,200 liter centerline drop tank.

René Francillon collection

"Mirage F1DDA", QA 62 "U", of the Qatar Emiri Air Force, at Orange-Caritat, France, during February, 1984. The Middle-Eastern camouflage is typical of QEAF aircraft. Noteworthy is the camouflaged 1,200 liter drop tank.

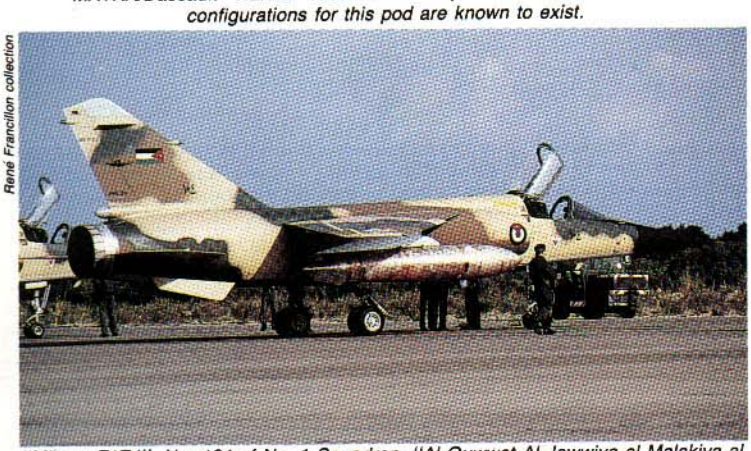
Michel Fournier

"Mirage F1EDA", QA 73, of the Qatar Emiri Air Force, with a centerline-mounted MATRA/Dassault "Harold" reconnaissance pod. At least two TV/camera configurations for this pod are known to exist.

Christian Boisselon

"Mirage F1EE", C.14B-61, of Escuadrón 462, Mando Aéreo de Canarias, Ejército del Aire, at Zaragoza-Valenzuela, during May, 1985. It carries a single 1,200 liter centerline drop tank and two wing mounted DEFA 30mm gun pods.

René Francillon collection



"Mirage F1EJ", No. 104 of No. 1 Squadron, "Al Quwwat Al Jawwiya al Malakiya al Urdiniya" (Royal Jordanian Air Force), during December, 1982. The visible 1,200 liter drop tank appears to have been recently stripped of paint.

René Francillon collection

"Mirage F1BK", No. 772, of the "Al Quwwat al Jawwiya al Kuwaitiya" (Kuwait Air Force), during May, 1985. It is finished in air superiority gray, the "F1" scheme now adopted by the KAF in place of the original desert camouflage.

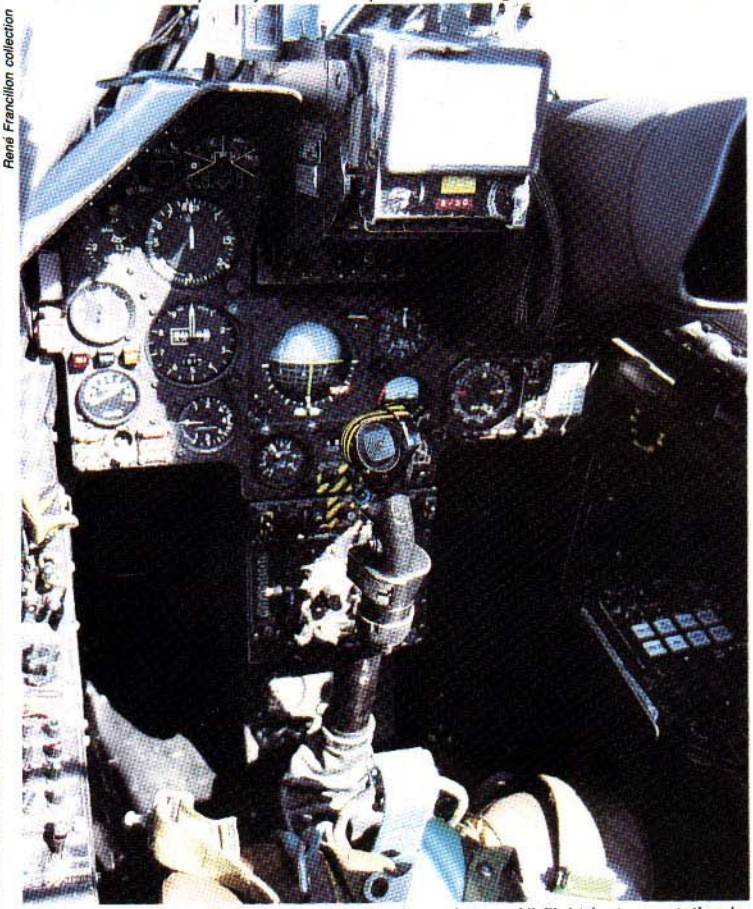
Patrick Bigel

A "Mirage F1CR" with twelve BRANDT BAP 100 parachute-retarded bombs mounted on ALKAN M2 wing pylons under each wing. The BAP 100 is considered a "cratering" weapon and is designed for runway destruction.

Patrick Bigel

Two "Mirage F1CR's", 33-ND and 33-NG, of E.R. 2/33, "Savoie", are seen with each carrying three 250 kg. SAMP general purpose iron bombs. Two bombs are mounted on ALKAN M2 wing pylons and one on an ALKAN 910 centerline pylon.

René Francillon collection



Almost all "Mirage F1C" instrumentation is analogue. All flight instrumentation is clustered on the T-shaped forward panel. This panel also supports the centrally mounted HUD, and the radar scope which is off-set to the right.

IN DETAIL:

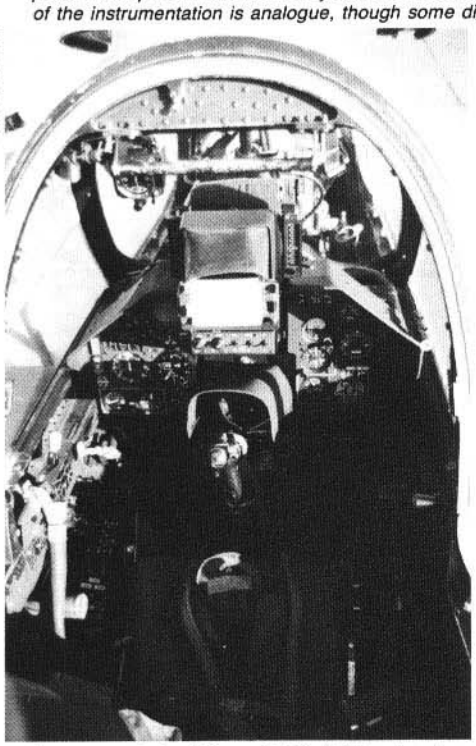
Jean-Michel Guhl

The "Mirage F1" cockpit is small by American standards, but none the less adequate. Front panel and console layouts are efficient and easily accessed. Most of the instrumentation is analogue, though some digital indicators are visible.

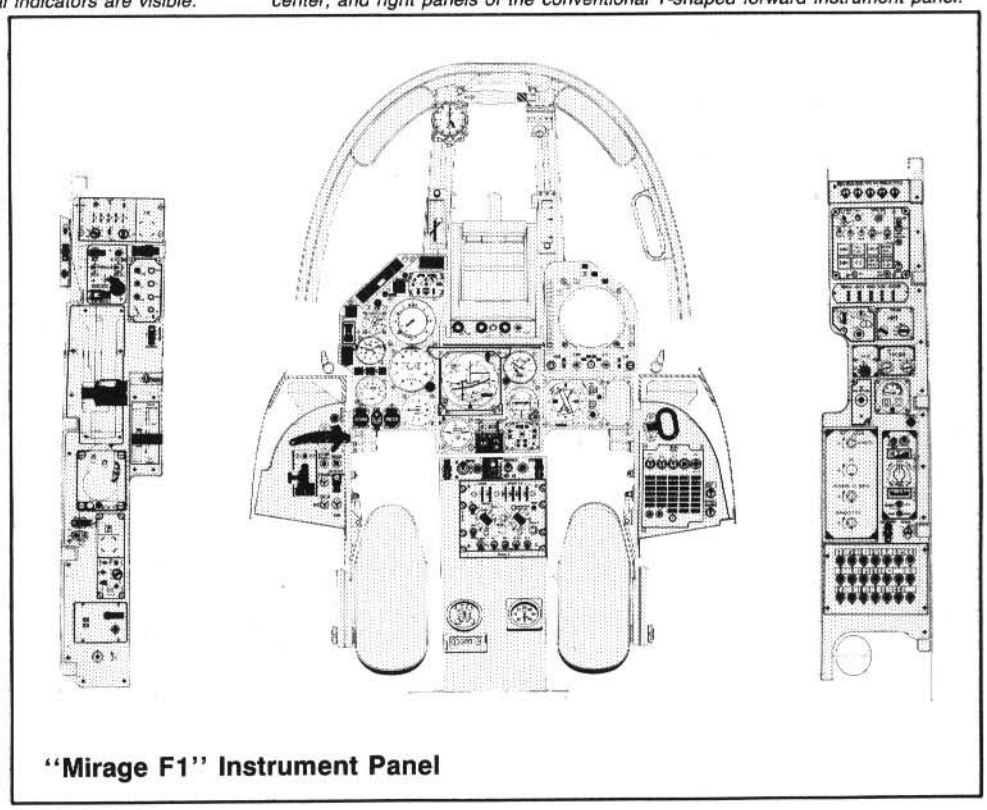
Jean-Michel Guhl

The large, centrally-mounted HUD takes up most of the "F1's" upper instrument panel space. Most of the standard flight instruments are located on the left, lower center, and right panels of the conventional T-shaped forward instrument panel.

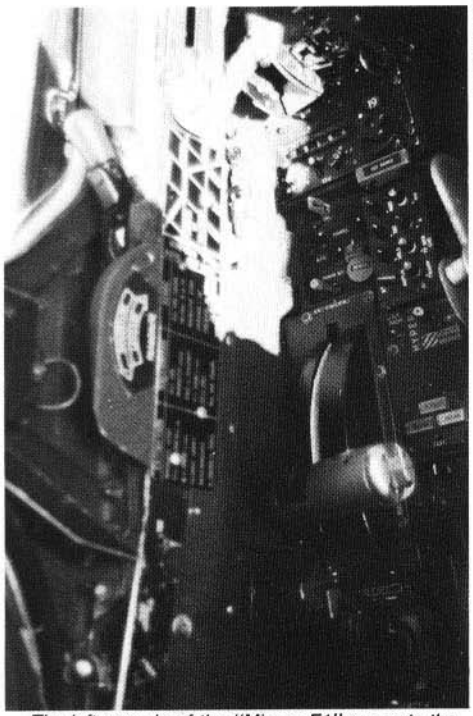
Jean-Michel Guhl



The rear seat of a "Mirage F1B". HUD and radar scope accommodations take up most of the instrument panel space.

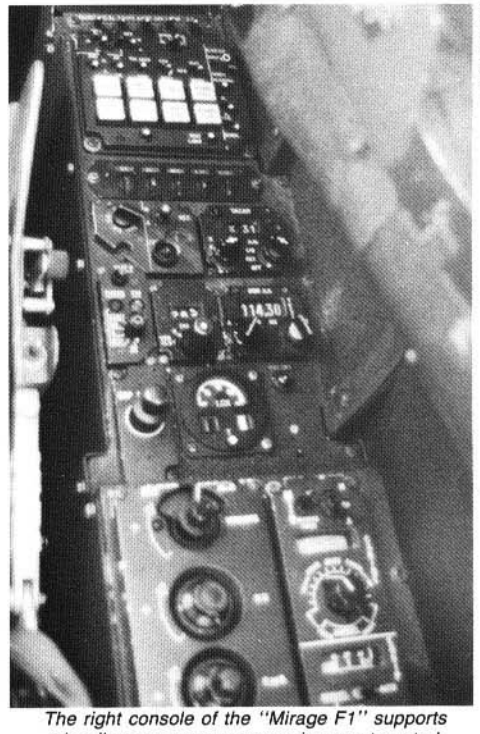


"Mirage F1" Instrument Panel



Michel Fournier

The left console of the "Mirage F1" supports the throttle quadrant, and miscellaneous communications, weaponry, and navigation systems panels.

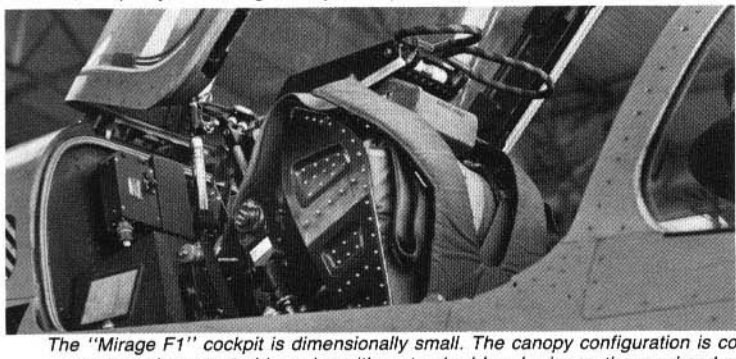


Michel Fournier

The right console of the "Mirage F1" supports miscellaneous weaponry, environment control, and communications systems panels.

Jean-Michel Guhl

The "Mirage F1" ejection seat headrest and rear cockpit. Like other aspects of "F1" design and construction, this area is neatly executed.



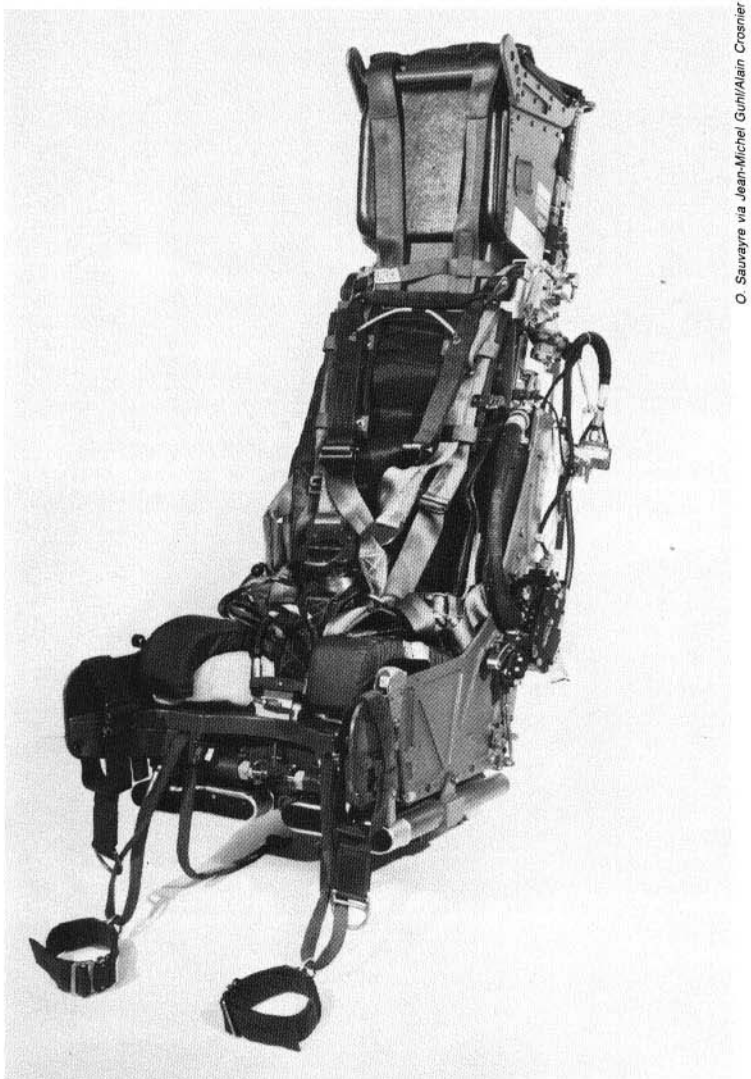
Alain Pelletier

The "Mirage F1" cockpit is dimensionally small. The canopy configuration is conventional and utilizes a single hydraulic ram for opening and closing. The ejection seat can be actuated by using either standard hand grips or the overhead pull rings. Visible in photo on left is the emergency egress knife (with barber pole handle) attached to the canopy frame. This can be used by the pilot to break the canopy plexiglas in case other forms of canopy removal fail.

Alain Pelletier

The two-seat training variants of the "Mirage F1", such as this "F1B", are equipped with an extended plexiglas canopy that accommodates the needs of both front and back seat occupants. Forward view requirements dictate that two-seat "Mirage F1's" have a taller transparency area than single-seat aircraft. Additionally, a fixed transparency section is mounted between the two crew stations to accommodate the side vision requirements of the back seat crew member.

René Francillon collection



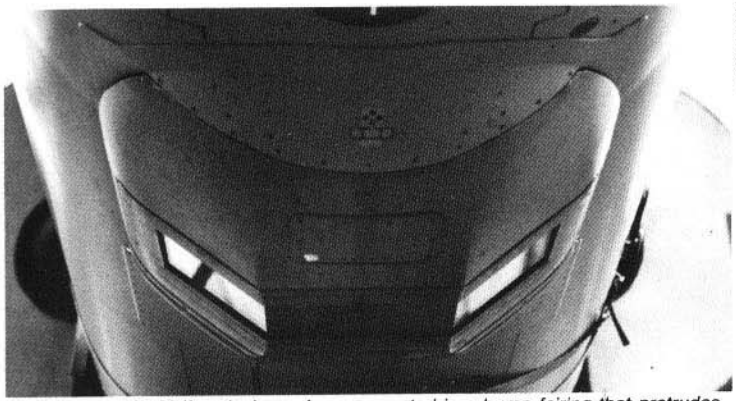
The "Mirage F1's" SEMMB Mk.10 ejection seat is designed for zero-zero operation and can be utilized throughout the "F1's" flight envelope. The seat was developed from the Martin Baker Mk.4 and built under license by SEMMB.

O. Sauvayre via Jean-Michel Guhl/Alain Crosnier

The "Mirage F1C's" Thomson-CSF "Cyrano IV" radar is a monopulse, I/J-band set employing a cassegrain scanner. It is utilized in several variations by the "F1", and in more advanced units has a limited look-down capability.

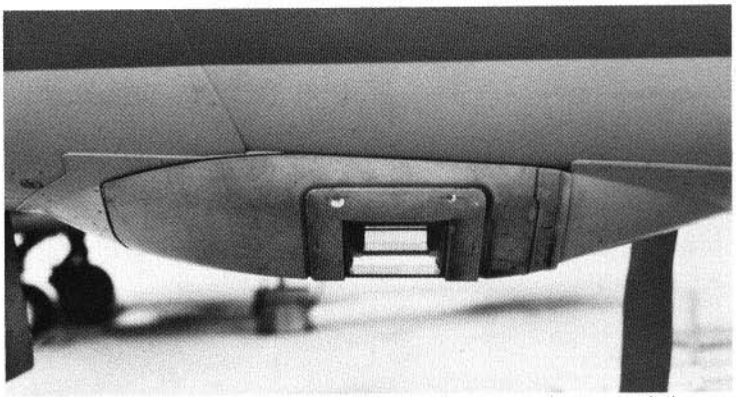
Jean-Michel Guhl

The "Mirage F1C's" Thomson-CSF "Cyrano IV" radar and its associated antenna are mounted behind a conventional composite materials radome. The radome is removable for radar system access. A pitot-type sensor is mounted at the very tip of the radome. Also visible are the static pitot-type sensors for airspeed and altitude calibration. The inflight refueling probe indicates several of these aircraft to be "Mirage F1-200's".



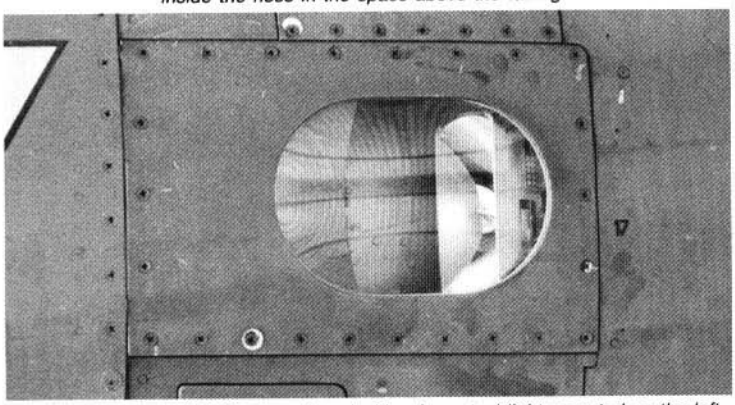
Alain Pelletier

The "Mirage F1CR" optical panels are mounted in a bump fairing that protrudes just below the nose near the nose gear well. The camera bay is located inside the nose in the space above the fairing.



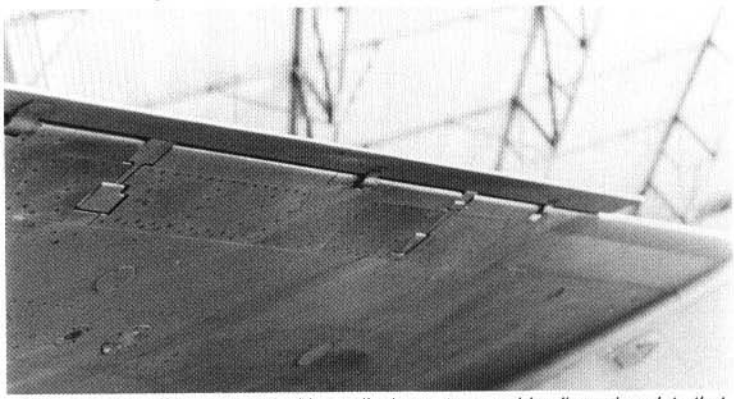
Alain Pelletier

The "Mirage F1CR's" bump fairing is basically an extension to permit the transport of a prism-equipped panoramic unit of reasonable focal length. The three glass panels are optically refined for photo reconnaissance.



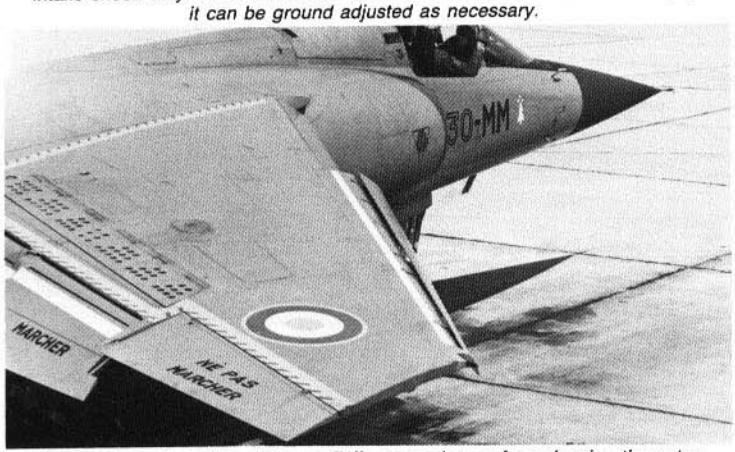
Alain Pelletier

Almost all "Mirage F1's" are equipped with a large taxi light mounted on the left intake cheek only. This unit is fixed and is not controllable from the cockpit; it can be ground adjusted as necessary.



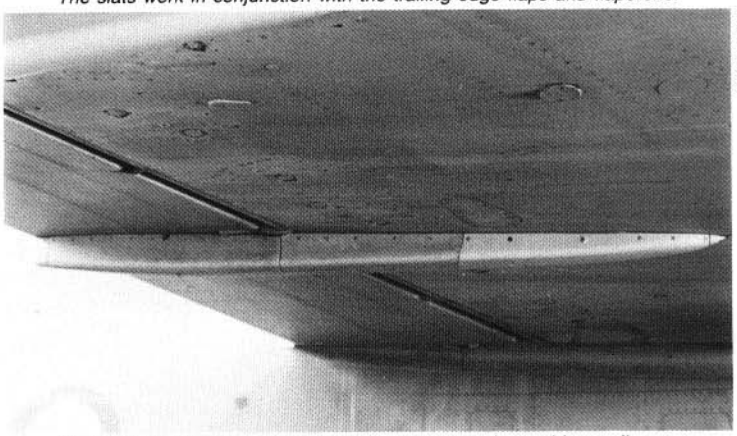
Alain Pelletier

The "Mirage F1" is equipped with small wing outer panel leading edge slats that increase the wing l/d during low speed flight and at high angles of attack. The slats work in conjunction with the trailing edge flaps and flaperons.



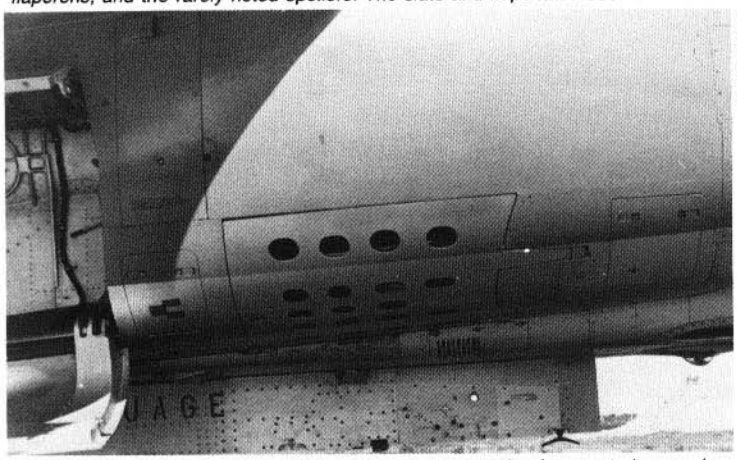
Alain Crosnier

An excellent view of the "Mirage F1" upper wing surface showing the outer panel leading edge slat, the inner panel leading edge flap, the slotted flaps, the flaperons, and the rarely noted spoilers. The slats and flaps have been extended.



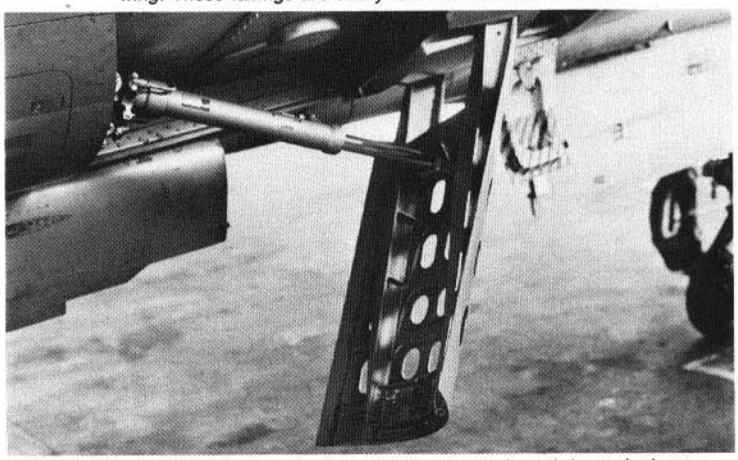
Alain Pelletier

The "Mirage F1's" flap hinges and actuators are located in small, aerodynamically refined fairings located on the bottom surface of each wing. These fairings are easily removed for maintenance.



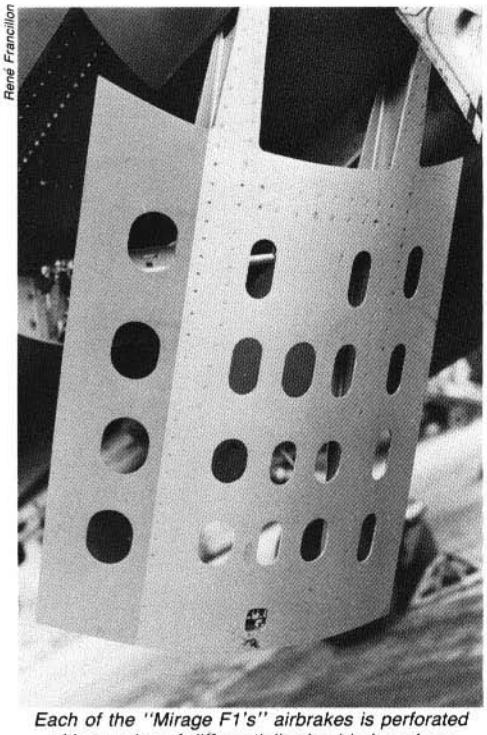
René Francillon

The "Mirage F1" is equipped with a two-part airbrake that is mounted on each side of the fuselage just ahead of the main landing gear. Each brake surface is pierced with holes of varying size that alleviate aerodynamic buffet.



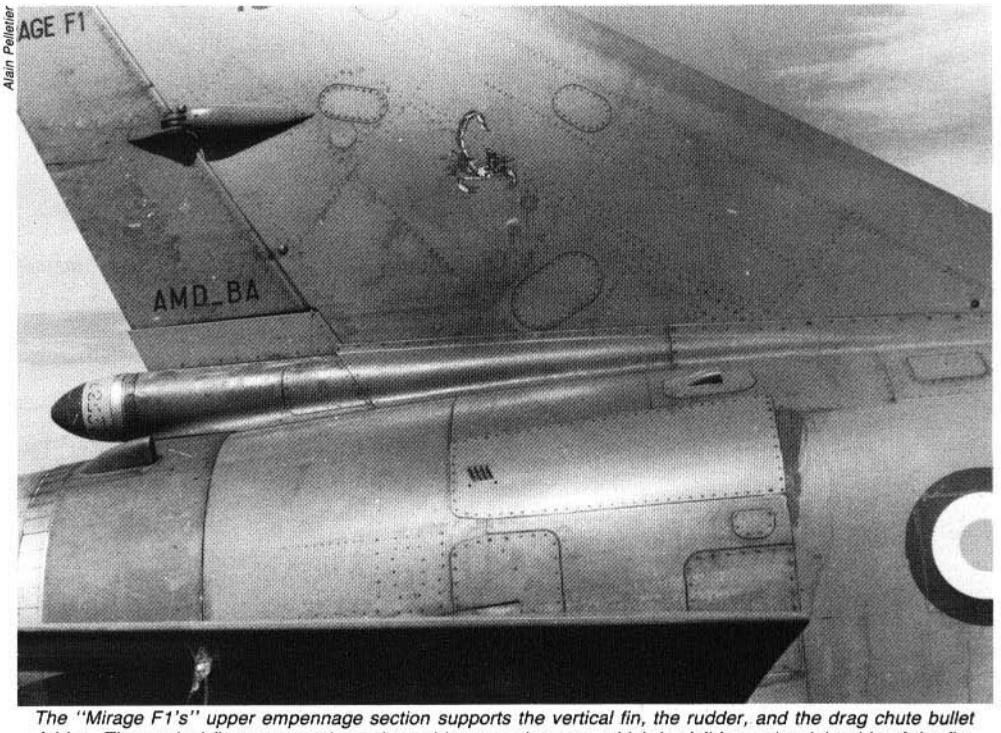
René Francillon

The "Mirage F1's" airbrakes are hydraulically actuated, each by a single ram. Each brake is rigidly attached to mounting arms that are hinged at their respective fuselage juncture points. This assembly forms a rugged and simple structure.



René Francillon

Each of the "Mirage F1's" airbrakes is perforated with a series of differentially-sized holes whose primary purpose is to alleviate surface buffeting.

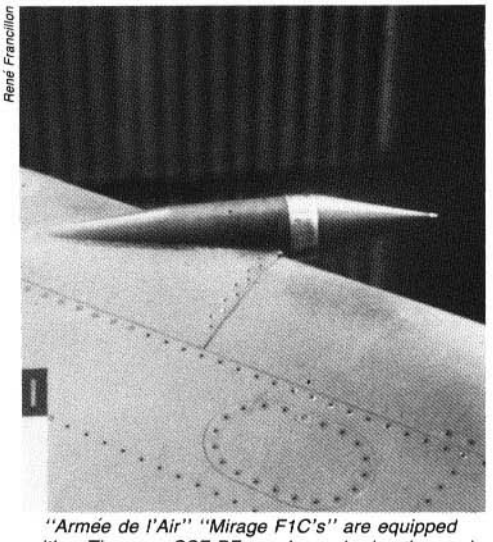


Alain Pelletier

The "Mirage F1's" upper empennage section supports the vertical fin, the rudder, and the drag chute bullet fairing. The vertical fin accommodates the rudder actuation ram, which is visible on the right side of the fin, only. The drag chute is deployed automatically when the bullet fairing cap is released.

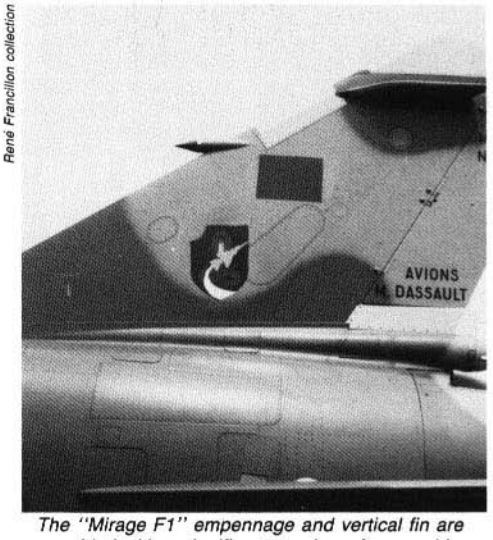
René Francillon

The "Mirage F1's" vertical fin is a conventional swept vertical surface with a single piece rudder. The rudder hinges are faired into the leading edge.



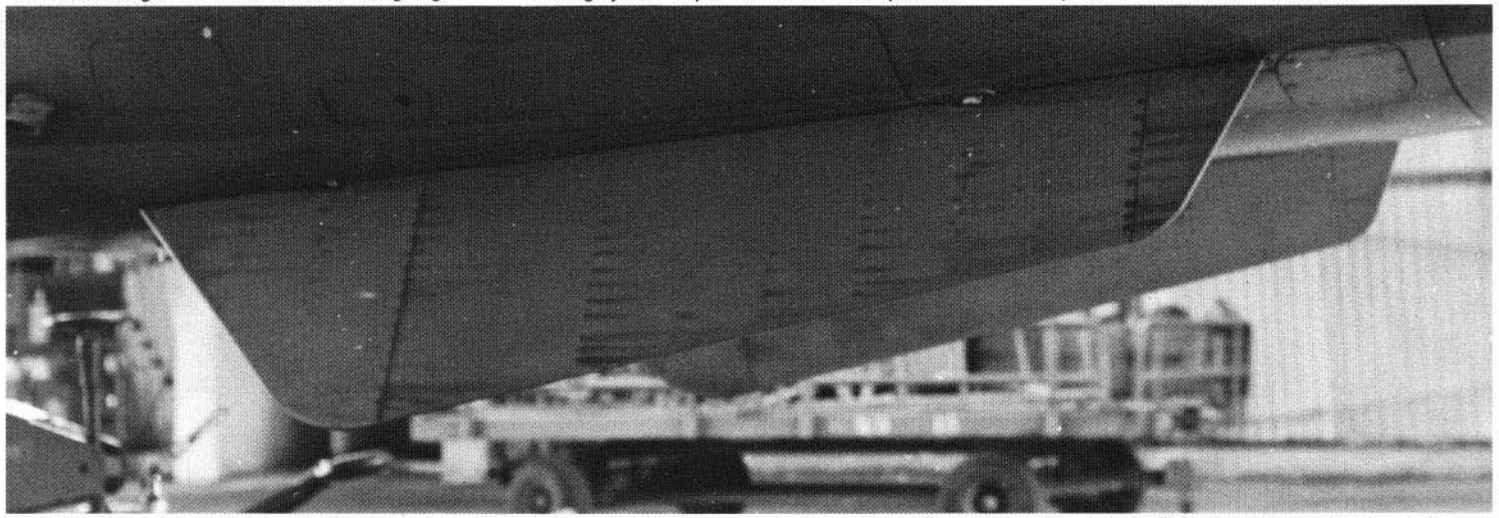
René Francillon

"Armée de l'Air" "Mirage F1C's" are equipped with a Thomson-CSF BF passive radar homing and warning system as part of their ECM complement.



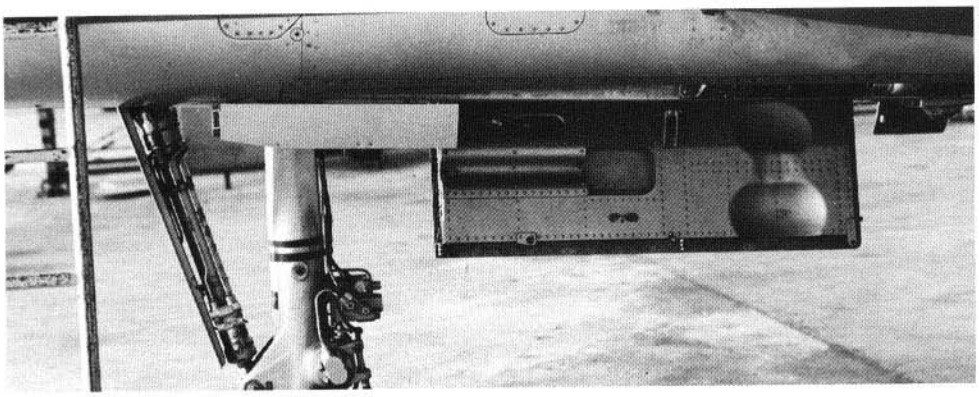
René Francillon collection

The "Mirage F1" empennage and vertical fin are provided with a significant number of removable panels to accommodate maintenance needs.

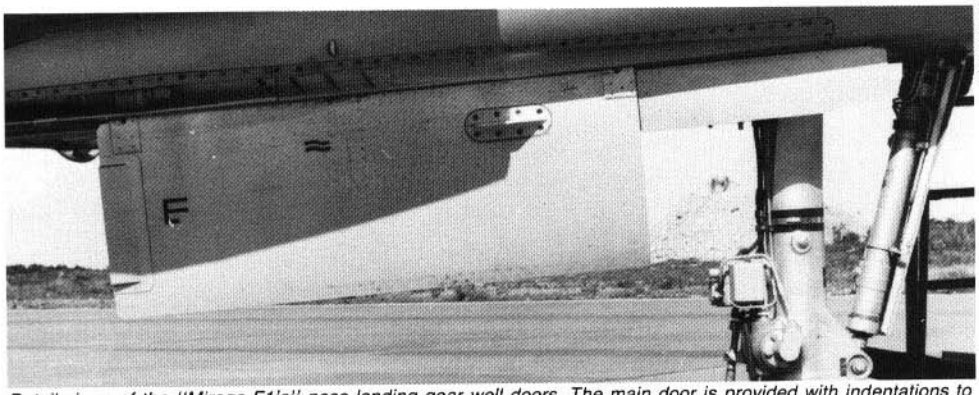


René Francillon

Because of the extreme maneuverability dictated by the "Mirage F1's" mission requirements, it was discovered very early in its flight test program that the airplane did not have sufficient vertical surface area to maintain directional stability at high angles of attack—particularly when operating in a high-Q (high dynamic force) environment. The solution to the problem, which conveniently sidestepped a major redesign of the vertical fin, was to add ventral fins.

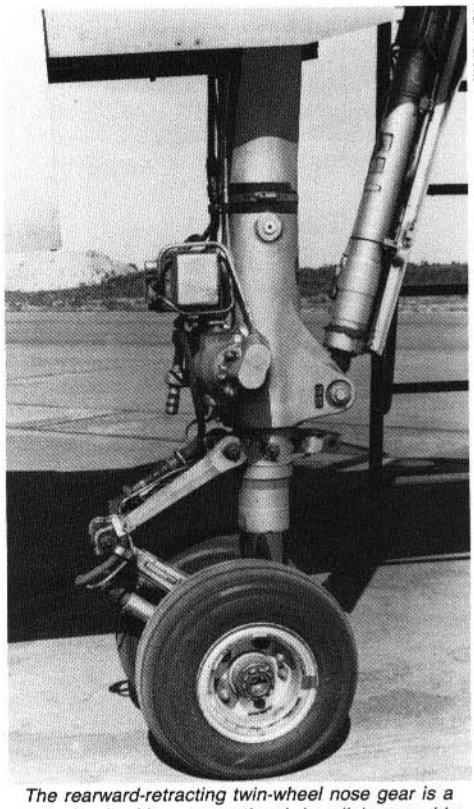


Alain Pelletier



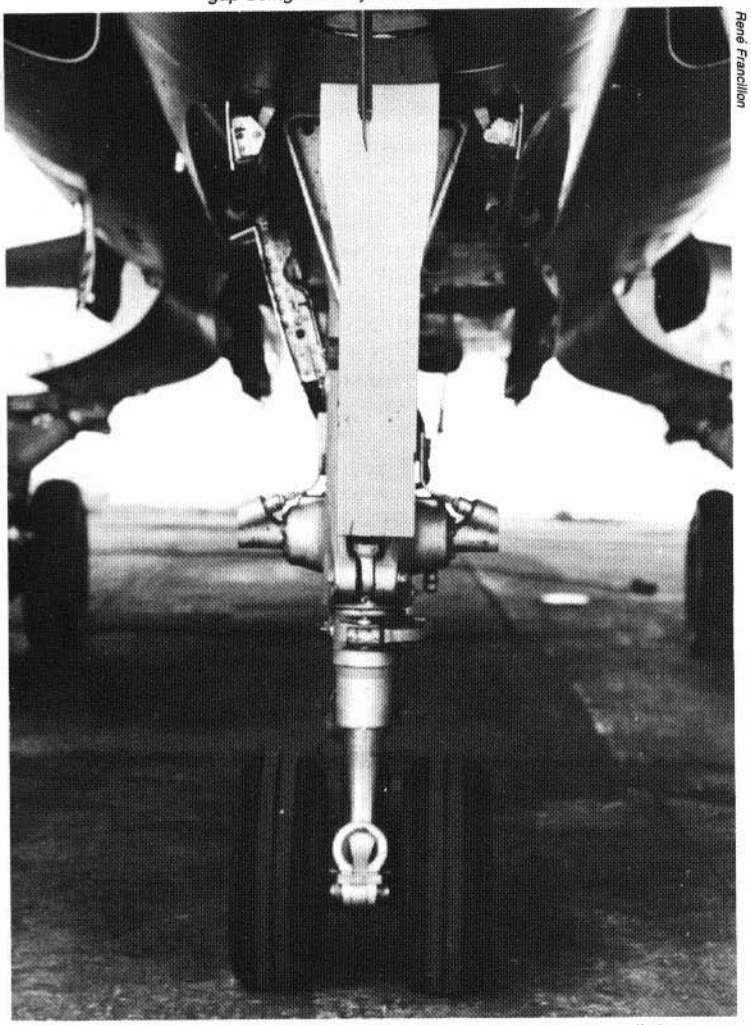
Alain Pelletier

Detail views of the "Mirage F1's" nose landing gear well doors. The main door is provided with indentations to accommodate the nose gear tires. Small doors cover the gear strut well as it retracts with the remaining gap being filled by the small door attached to the hydraulic ram.

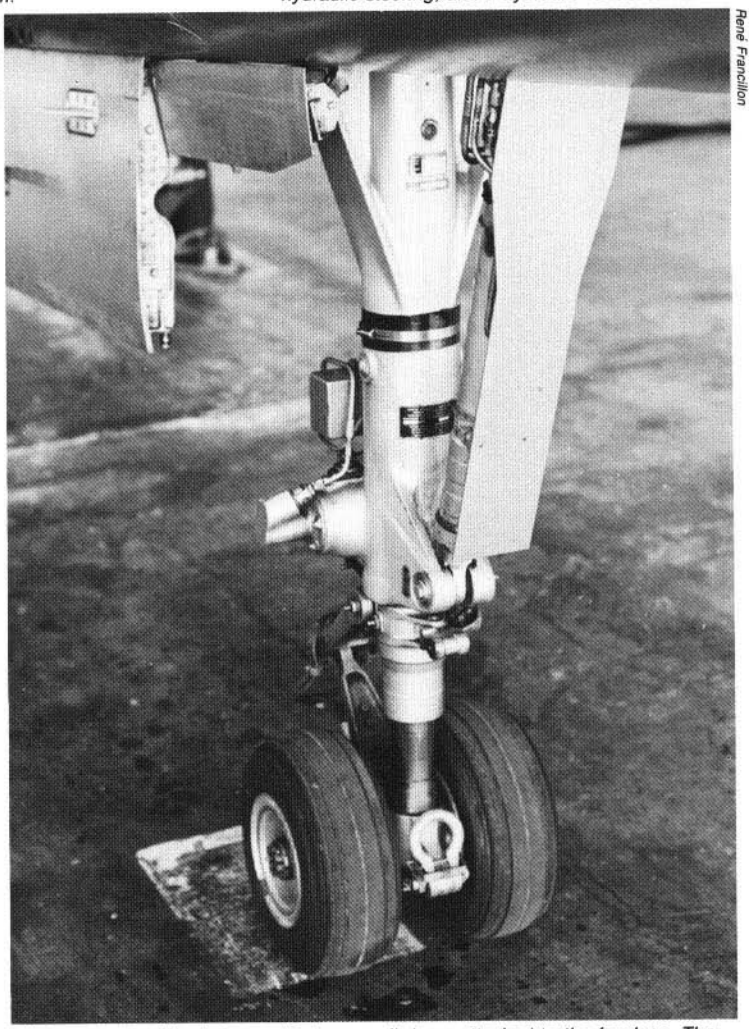


Alain Pelletier

The rearward-retracting twin-wheel nose gear is a rugged unit with a conventional drag link assembly, hydraulic steering, and a hydraulic retraction ram.



René Francillon



René Francillon

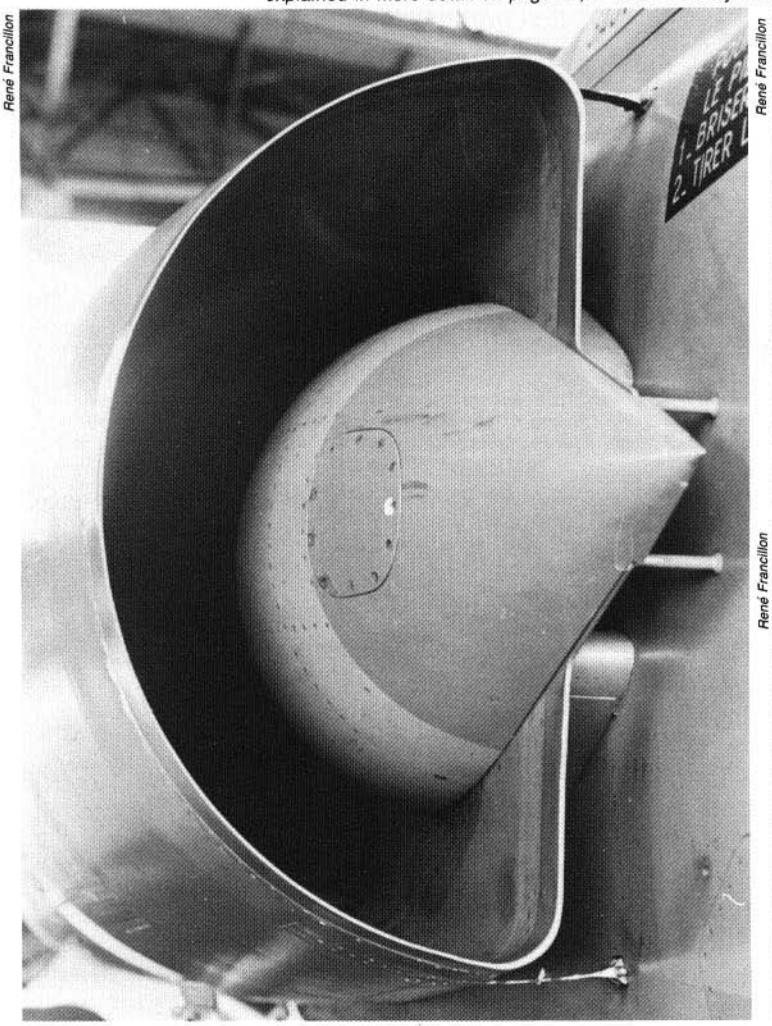
The nose gear strut assembly is equipped with its own small gear well door to cover the space remaining between the two small doors attached to the fuselage. The unit is steerable from the cockpit using the rudder pedals, and towing can be accommodated by attaching a tow bar to the tow bar link mounted between the two wheels on the axle front. The high pressure Dunlop tires are 360 x 135's.

René Francillon

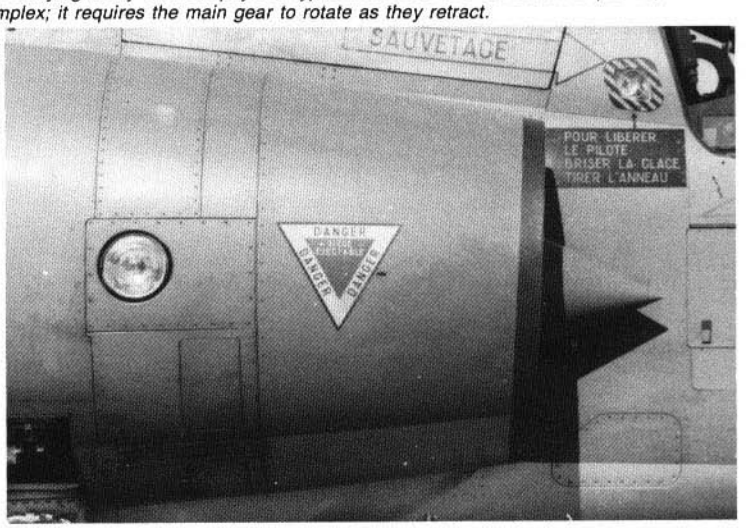
René Francillon

The "Mirage F1's" main gear assembly is perhaps the single most complex structure in the aircraft. It is designed to be both exceptionally rugged and amazingly versatile, and it permits the aircraft to operate from a variety of surfaces while carrying many different payload types and sizes. The retraction sequence, explained in more detail on page 32, is extraordinarily complex; it requires the main gear to rotate as they retract.

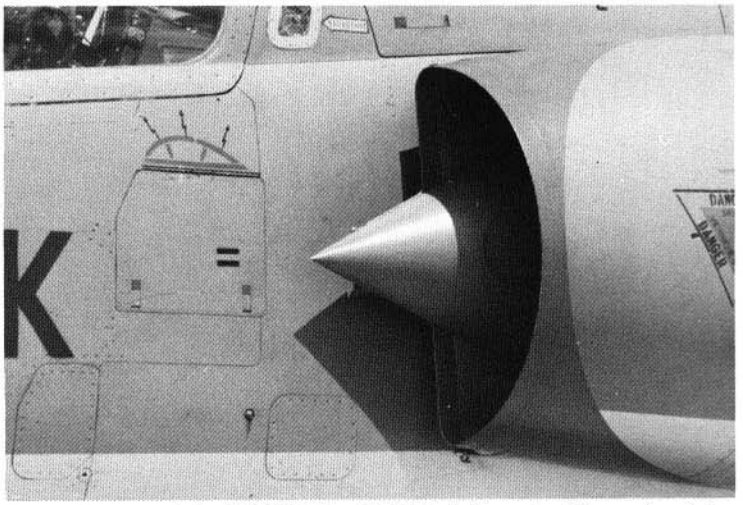
René Francillon



René Francillon

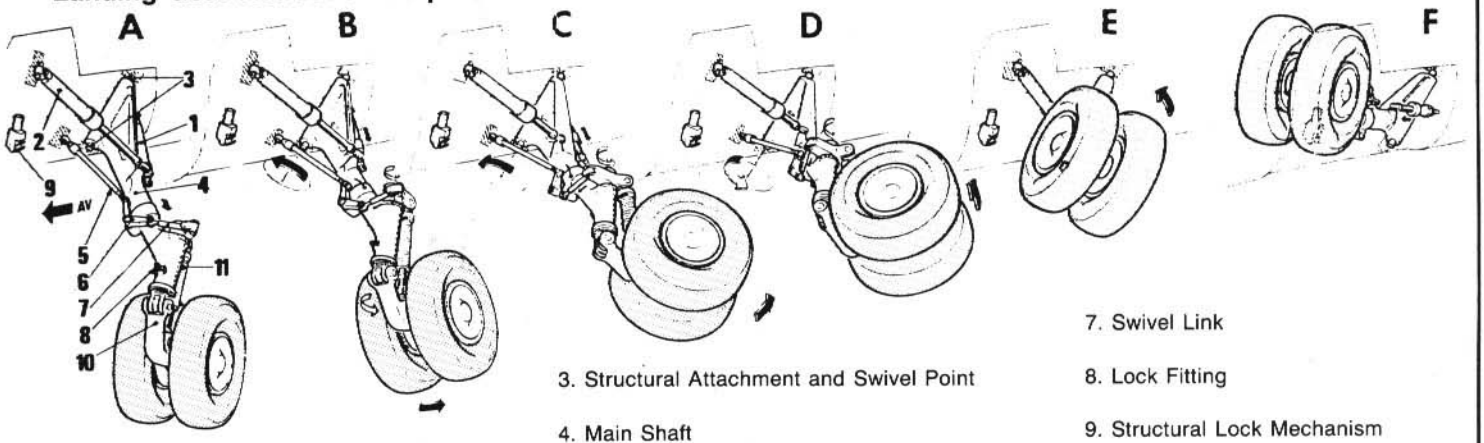


René Francillon

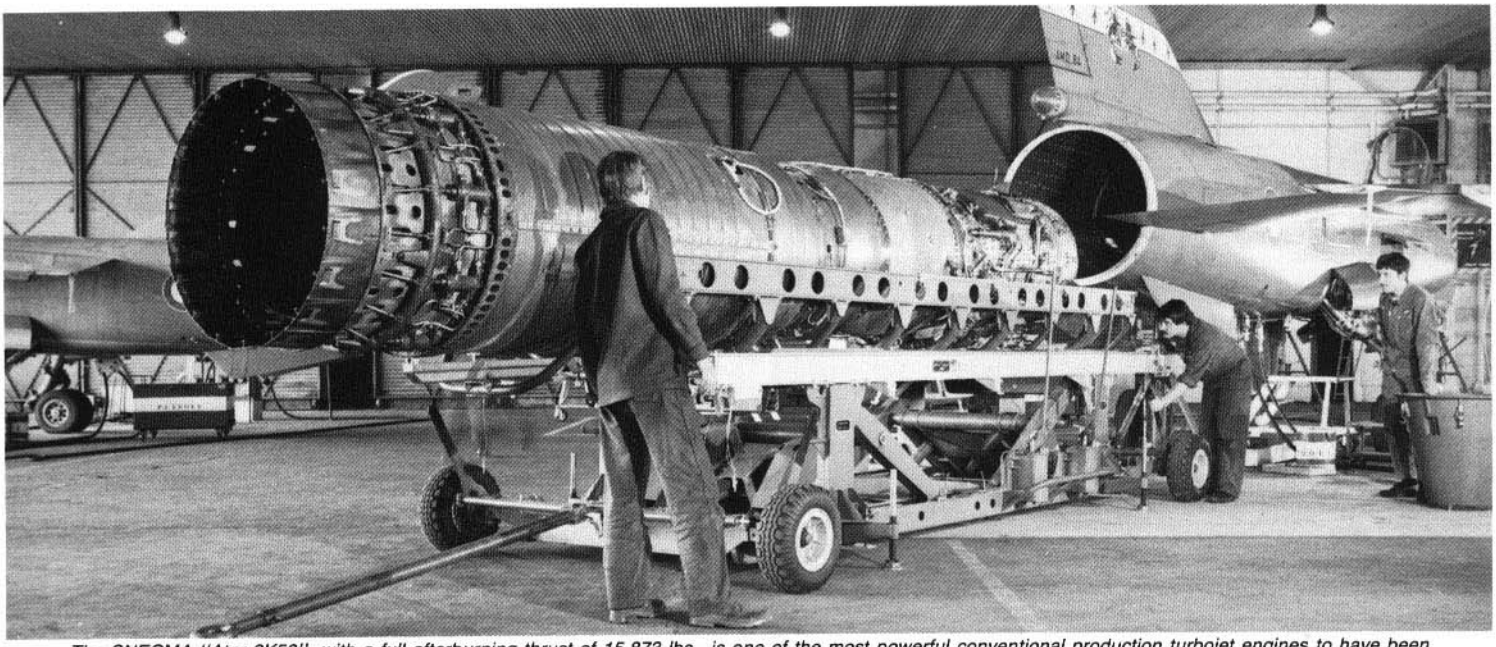


The "Mirage F1's" air intakes are designed to efficiently accommodate the combustion requirements of the SNECMA "Atar 9K50" turbojet engine. The semi-conical center bodies are hydro-mechanically actuated to control the shock wave generated as the aircraft operates at supersonic speeds. The intakes are mounted out from the fuselage sides in order to accommodate the requirements of boundary layer bleed. Note spotlight on right intake cheek of aircraft in lower right photo.

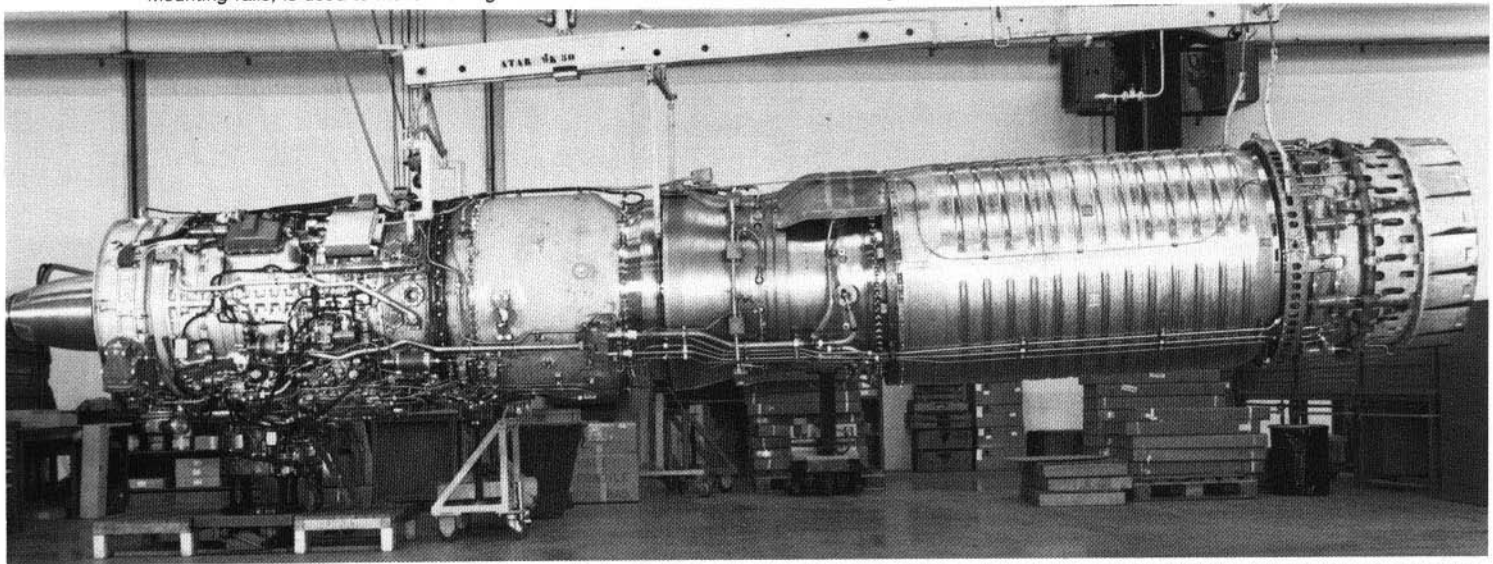
Landing Gear Retraction Sequence



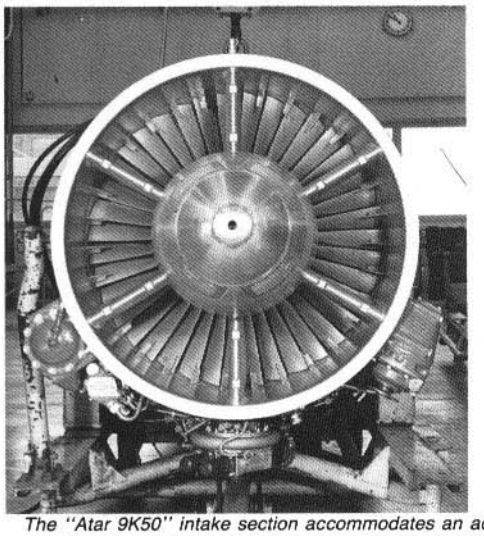
1. Retraction Actuator
2. Bracing Strut
3. Structural Attachment and Swivel Point
4. Main Shaft
5. Oleo Rod
6. Swivel Joint
7. Swivel Link
8. Lock Fitting
9. Structural Lock Mechanism
10. Rocking Arm
11. Main Strut



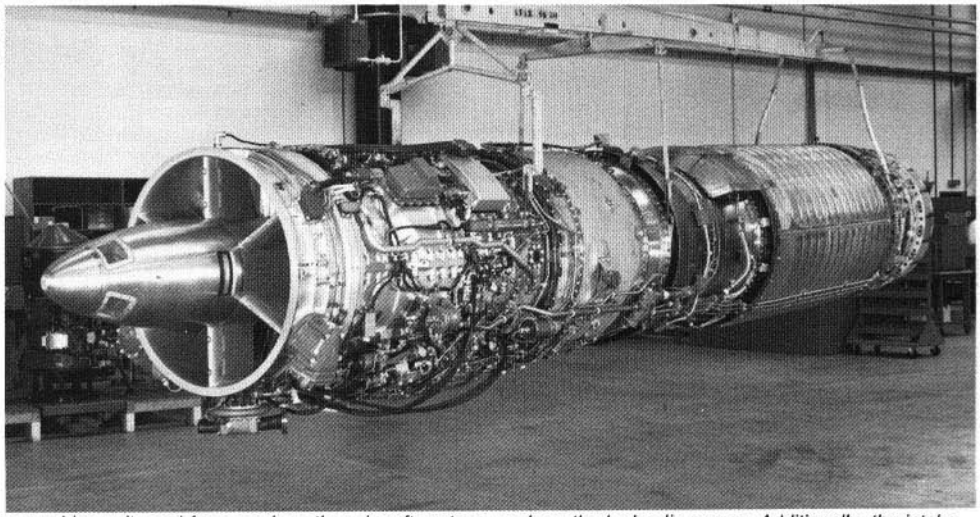
The SNECMA "Atar 9K50", with a full afterburning thrust of 15,873 lbs., is one of the most powerful conventional production turbojet engines to have been manufactured in Europe. The "Atar 9K50" is serviced by removing it through the aft end of the "Mirage F1" empennage. A special dolly, with articulated mounting rails, is used to move the engine and to raise it to insertion or removal height. The engine has an installed weight of 3,487 lbs.



Overall length of the SNECMA "Atar 9K50" with afterburner attached is 19 ft. 6 in. The aft portion of the engine angles upward slightly to accommodate the fuselage dimensional and thrust line requirements of the "Mirage F1". The afterburner is a modulated unit with an integral variable area exhaust nozzle. The latter is associated with an 'approach control' system which permits the aircraft to maintain a near-constant airspeed during landing approaches.

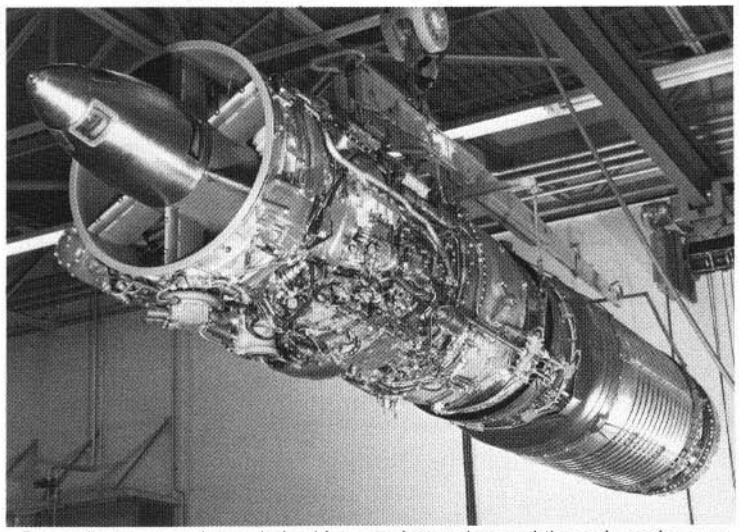


SNECMA



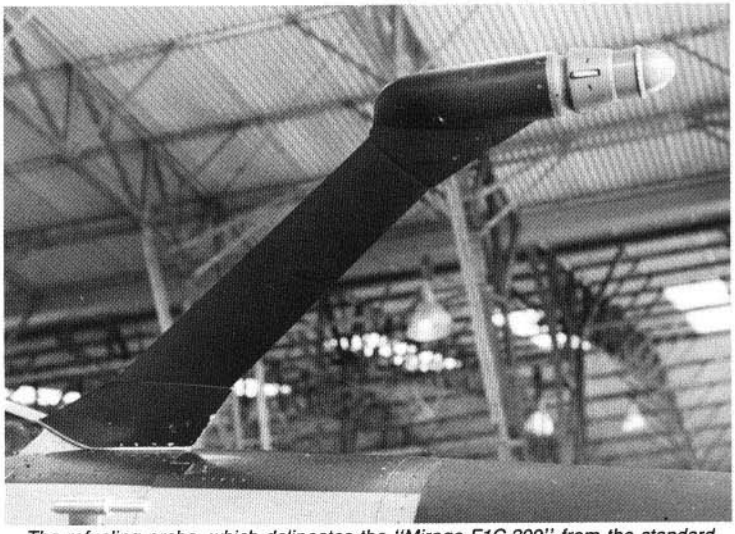
SNECMA

The "Atar 9K50" intake section accommodates an accessory-drive unit used for powering other aircraft systems such as the hydraulic pumps. Additionally, the intake section accommodates engine electronics and various electro-mechanical controls. The nine-stage compressor section has fixed-geometry blades optimized for the widest possible performance envelope. Provisions are made for deicing. Visible on the afterburner is a heat shroud to protect the empennage.



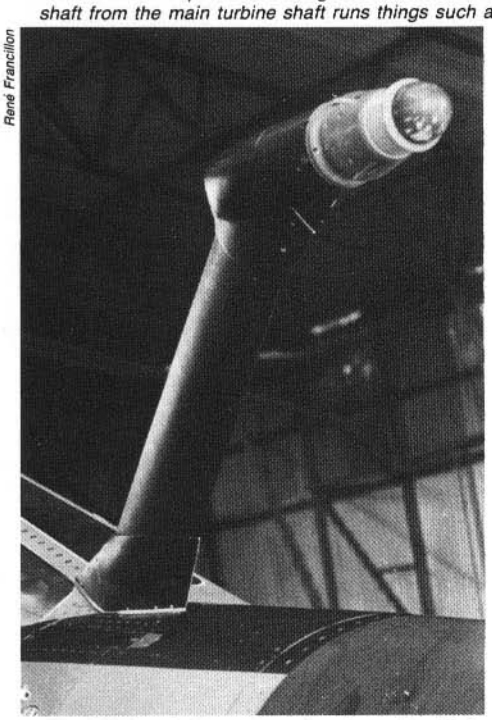
SNECMA

Powerplant accessories and plumbing are clustered around the main engine core with the more space-consuming items mounted underneath. A power take-off shaft from the main turbine shaft runs things such as fuel and hydraulic pumps.



René Francillon

The refueling probe, which delineates the "Mirage F1C-200" from the standard "F1C", has been retrofitted to a number of early production aircraft. Late production samples have been manufactured with the probe as a standard feature.



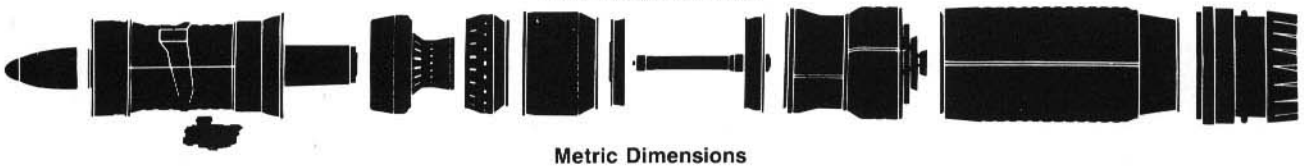
René Francillon

Patrick Bigel

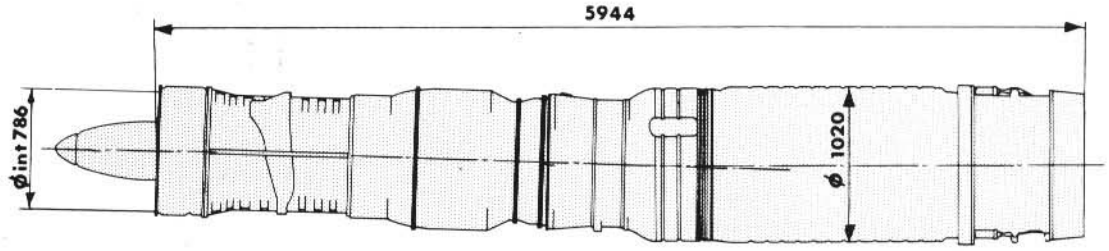
The inflight refueling probe, when it was installed as a modification on older production "Mirage F1C's", entailed a nose plug insert, thus increasing the aircraft overall length. To accommodate the forward vision requirements of the pilot, the probe was designed to be offset to the right side of the aircraft. The probe's male fitting is standardized for use with all U.S. and European and NATO inflight refueling tankers.

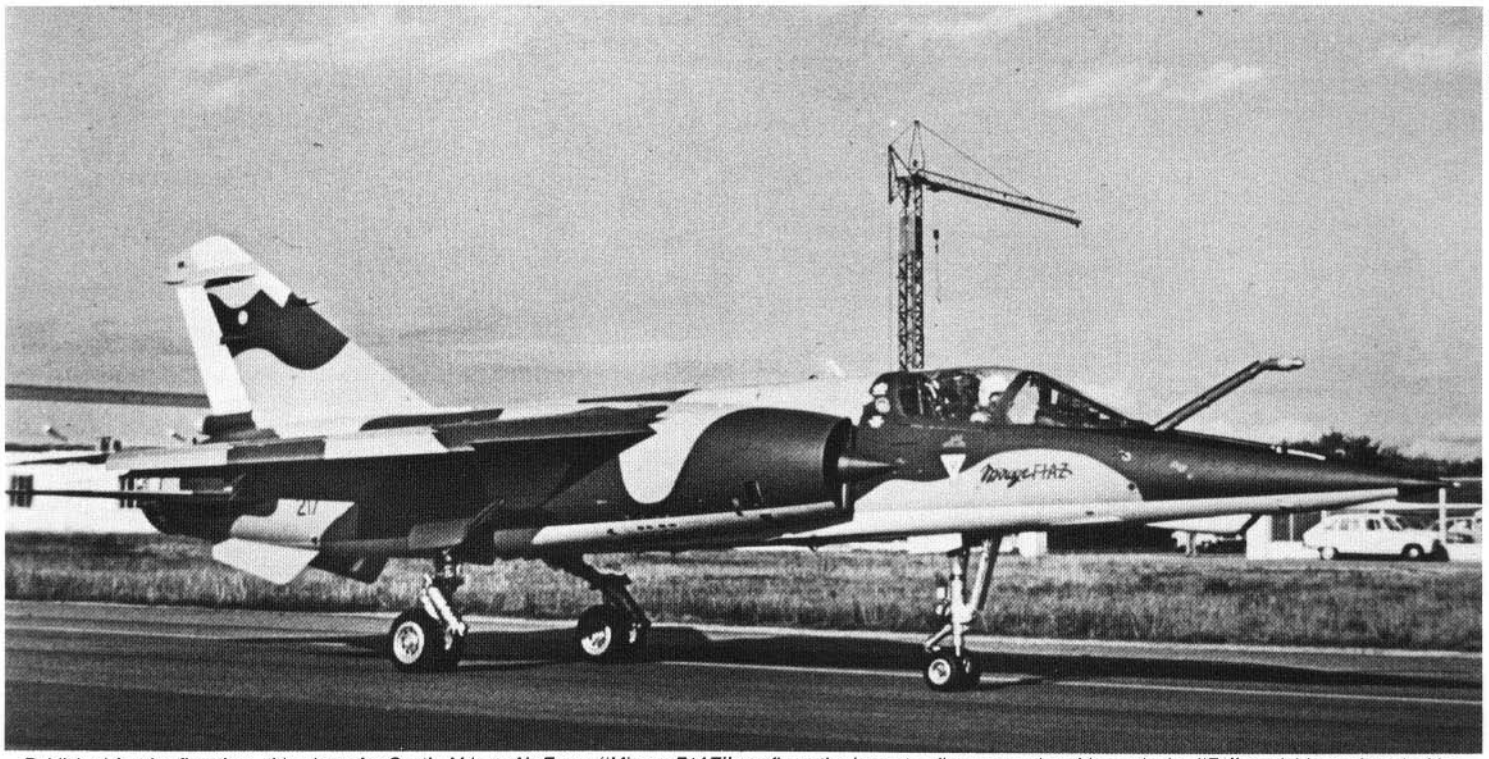
SNECMA "Atar 9K50"

Main Sub-Assemblies



Metric Dimensions

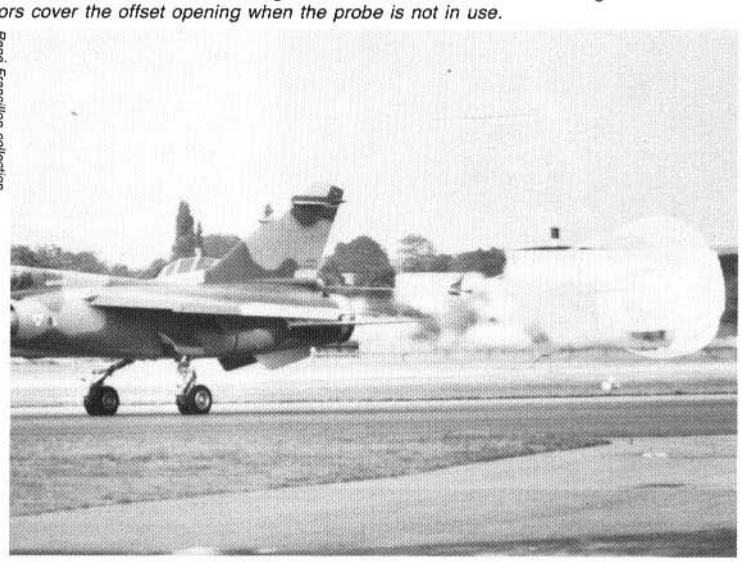




Alain Pelletier

Published for the first time, this view of a South African Air Force "Mirage F1AZ" confirms the long-standing rumor that this particular "F1" model is equipped with a retractable nose-mounted inflight refueling probe. Visible is the probe design variation from the non-retracting unit, and the sizable nose slot designed to accommodate the probe in its retracted position. Small doors cover the offset opening when the probe is not in use.

René Francillon collection

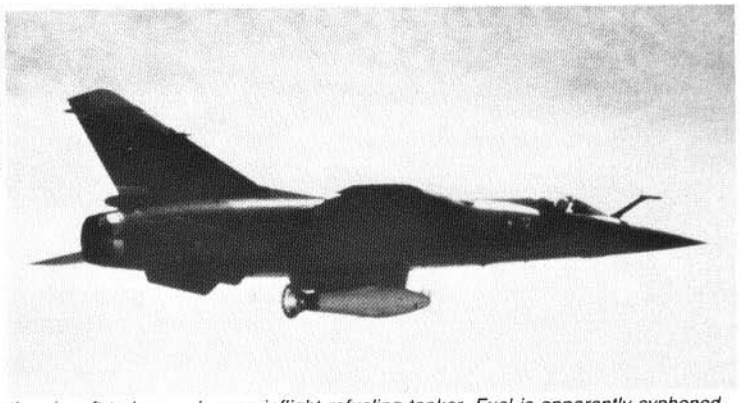


René Francillon collection

A camouflaged "Mirage F1B" is seen (rt.) with its large drag chute deployed, immediately following landing. The drag chute is housed in a bullet fairing situated just above the empennage section with the chute deployment door mounted just above the engine exhaust nozzle. The bullet fairing is known to have been used on occasion to house an advanced, but unidentified electronic countermeasures unit working in conjunction with a set of wing-mounted ECM pods.

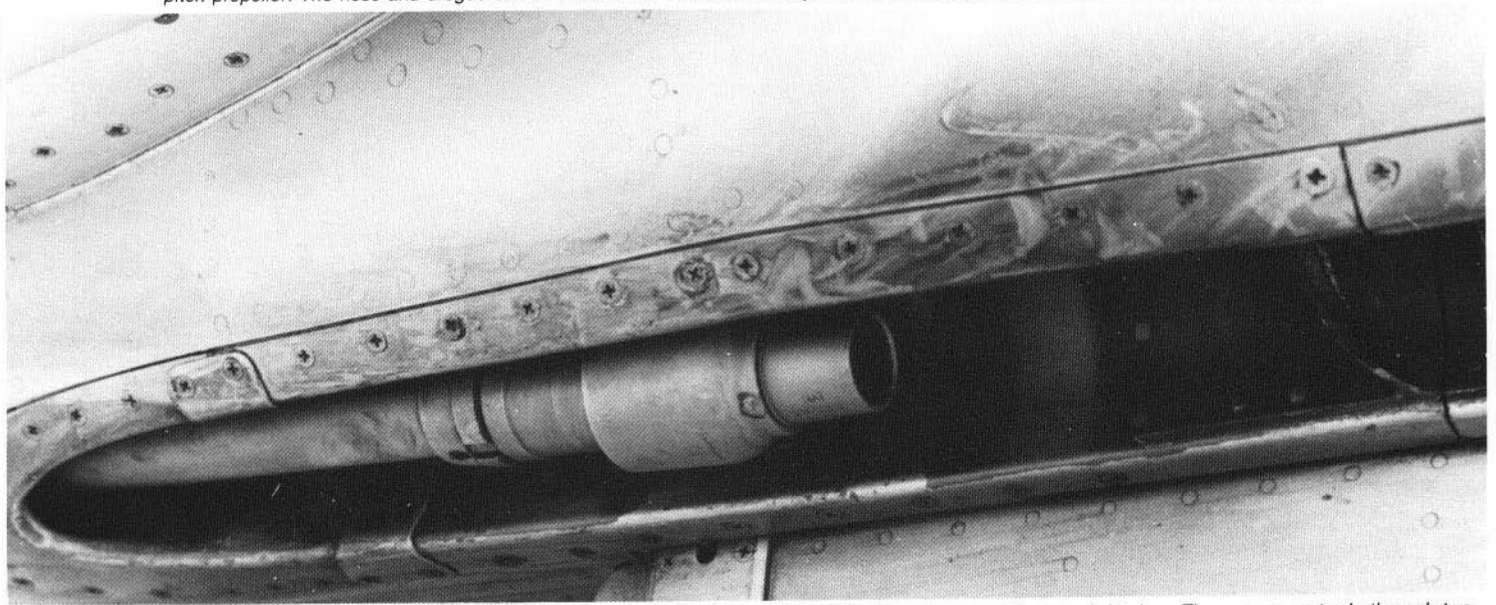
René Francillon collection

René Francillon collection



The "Mirage F1" is capable of carrying an inflight refueling buddy pack that allows the aircraft to be used as an inflight refueling tanker. Fuel is apparently syphoned from onboard and external tanks and delivered to the receiver aircraft via the buddy pack. The buddy pack system is powered by a small, nose-mounted variable pitch propeller. The hose and drogue can be retracted or extended as required via the buddy pack reel and associated power supply.

Alain Pelletier



The "Mirage F1" normally carries two DEFA 553 30mm cannon mounted in the lower center fuselage, between the two air intakes. These guns protrude through two recessed fairings and are bore-sighted for accuracy and coordination with the cockpit HUD. Each gun is provided with 135 rounds of ammunition, which can be expended at a rate of 1,300 rpm, if necessary. The guns are easily accessed through removable fuselage panels.

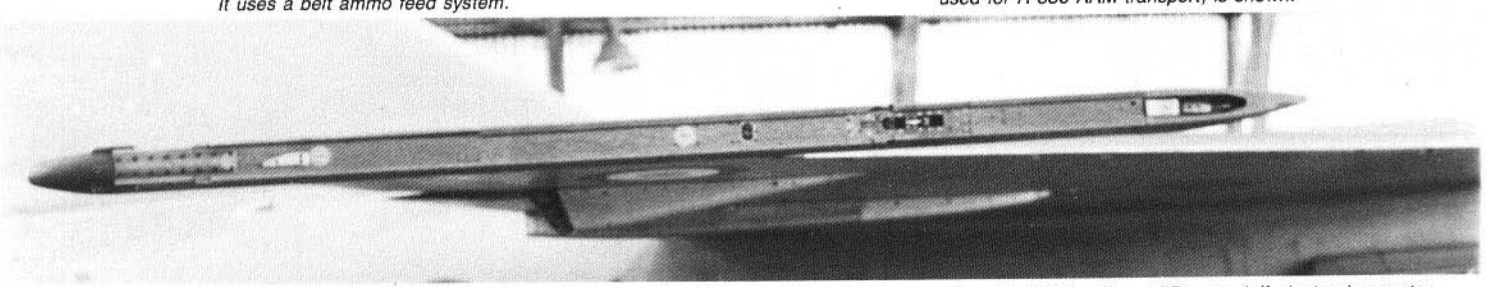
Alain Pelletier

The DEFA 553 is a single barrel gun with a revolver type breech and associated loading mechanisms. It weighs 179 lbs. and is electro-mechanically operated. It uses a belt ammo feed system.

René Francillon

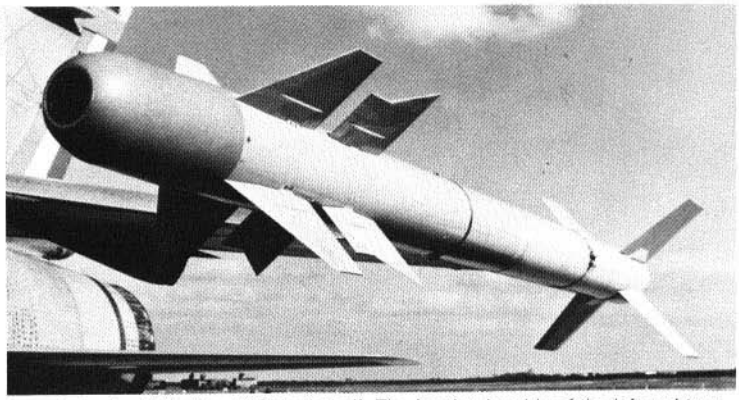
Various pylons can be used in conjunction with the "Mirage F1", including the ALKAN 910, the ALKAN 915, and the AMD-BA. A type 38DN pylon, normally used for R 530 AAM transport, is shown.

René Francillon



The wingtip serves as the primary mounting point for the AAM missile rails and miscellaneous items such as the "Phimat" and "Barracuda" electronic countermeasures pods. The MATRA R 550 "Magic" is usually mounted in this position. Also, some export "Mirage F1's" can be armed with U.S. manufactured "Sidewinder" AAM's, instead of "Magic".

MATRA

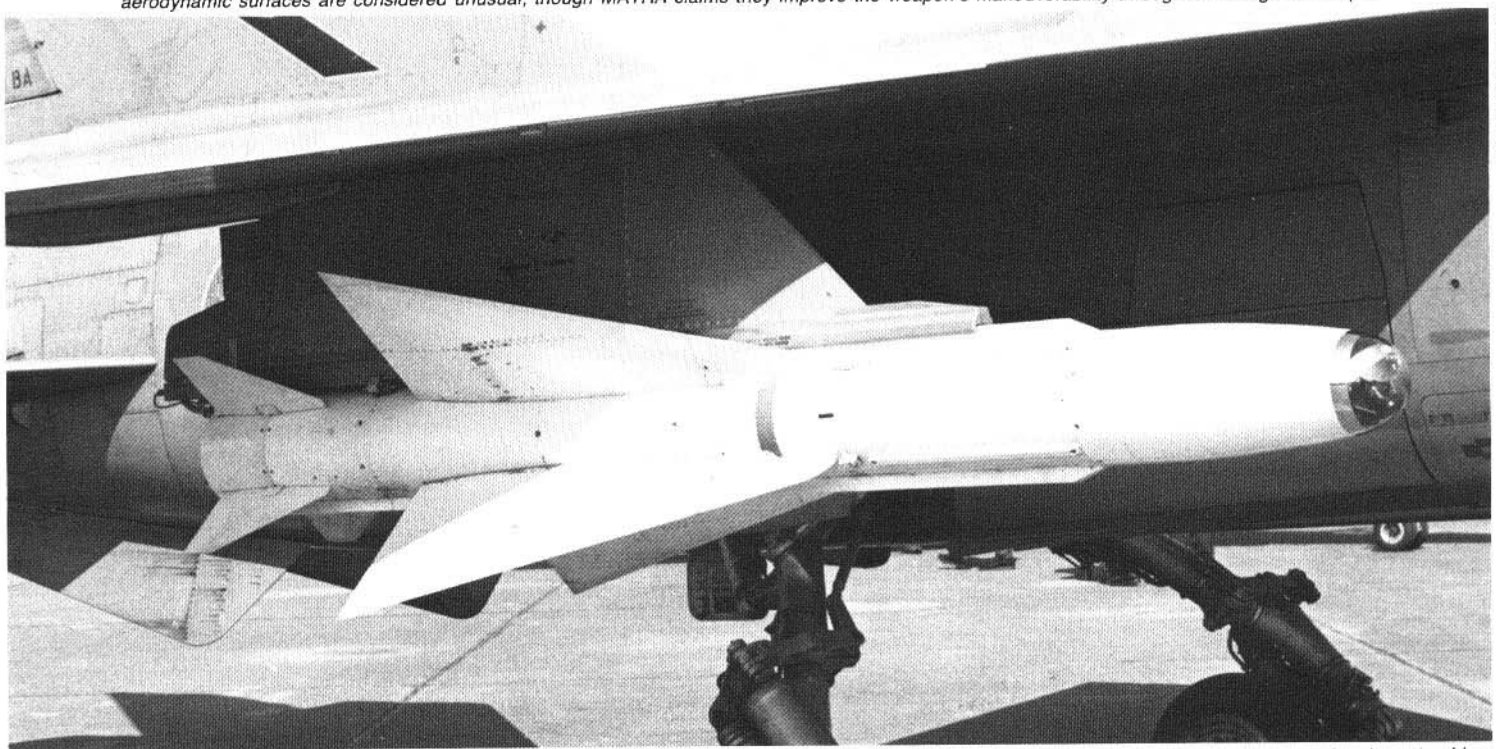


MATRA

The MATRA R 550 "Magic" is a relatively short range weapon comparable in most respects to the Philco/Ford "Sidewinder". The homing head is of the infrared type, and aerodynamic control is via the second set of canard vanes. The other aerodynamic surfaces are fixed. Propulsion is via a short duration solid fuel rocket engine that occupies most of the aft half of the missile. The warhead and proximity fuse are located at mid-point, just ahead of the rocket engine.

René Francillon collection

The MATRA "Super 530" AAM has a relatively long range and is optimized for reaching targets flying at very high altitudes (over 75,000 ft.) and Mach numbers (over Mach 3). It is equipped with a semi-active radar-type homing head and is considered capable of all-weather operation. The very low aspect ratio primary aerodynamic surfaces are considered unusual, though MATRA claims they improve the weapon's maneuverability throughout its flight envelope.



René Francillon collection

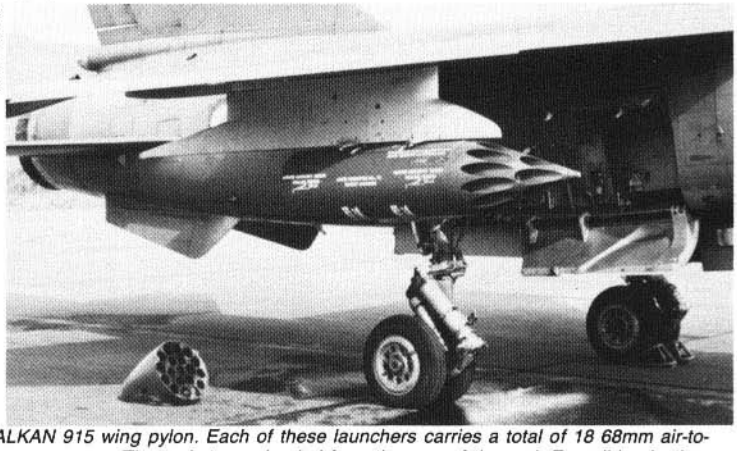
The medium range MATRA R 530 could be fitted with either an infrared-homing head (as shown) or one with semi-active radar guidance. The R 530 has been trouble plagued almost from the start of its service introduction. Its p.k. (probability of kill) figure, which has never exceeded .35, is exceptionally low. The main aerodynamic surfaces are fixed, with control being obtained via the movable rear surfaces.

Michel Fournier

The MATRA R 530 is normally painted white with the sensor head painted silver or some other light color. A removable cap normally protects the infrared sensor receiver and associated glass dome when the aircraft is sitting statically. The R 530 is normally carried under the "Mirage F1" using a Type 38DN pylon. It is possible for the "Mirage F1" to carry up to three R 530's at one time.

Alain Pelletier

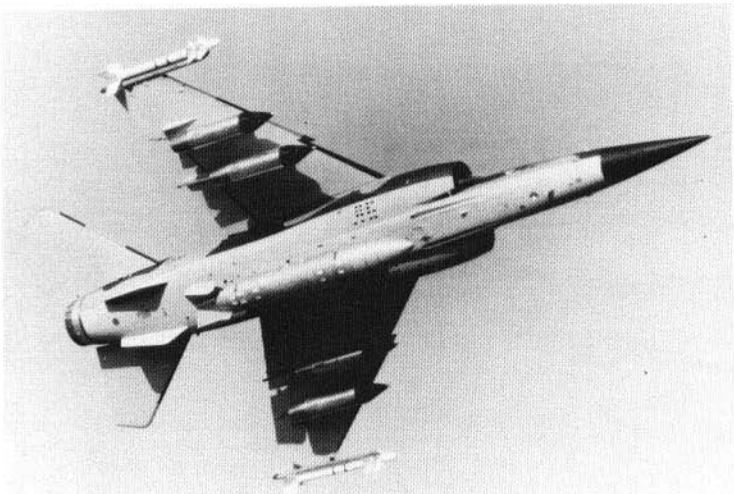
Alain Pelletier



MATRA F4 68mm rocket launchers can be attached to the "Mirage F1" using an ALKAN 915 wing pylon. Each of these launchers carries a total of 18 68mm air-to-surface solid fuel fin-stabilized rockets which are salvo launched against targets as necessary. The rockets are loaded from the rear of the pod. Frangible plastic fairings fill the forward pod exits, these disintegrating as the rockets are ignited and propelled forward.

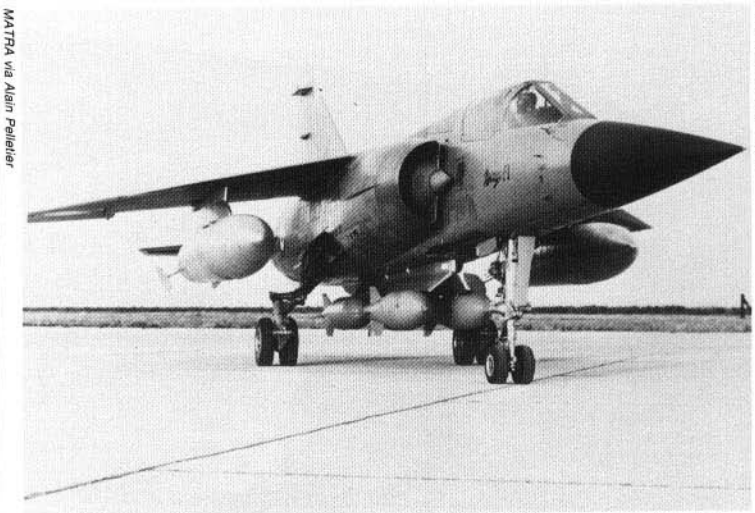
MATRA via Alain Pelletier

A prototype "Mirage F1" is seen carrying a load of six MATRA-BRANDT "Bélouga" grenade launchers and two MATRA R 550 "Magic" AAM's. Each "Bélouga" pod carries 166 2.65 lb. grenades which can be sequentially ejected over target areas leaving a rather large path of destruction. The small grenades are forcibly ejected from the pod via small pyrotechnic charges. The grenades descend by parachute, exploding upon ground contact.



MATRA via Alain Pelletier

A "Mirage F1" painted in South African Air Force camouflage, is seen during the 1979 Paris Airshow while carrying two MATRA R 550 "Magic" AAM's, four MATRA LR 155 rocket pods, and a single 1,200 liter centerline drop tank.



Dassault via Alain Pelletier

A "Mirage F1" prototype poses for photos while carrying a pair of 1,200 liter external drop tanks, and four 400 kg. (881 lbs.) iron bombs mounted on an ALKAN pylon.

MATRA via Alain Pelletier

A "Mirage F1" prototype is seen carrying eight 430 lb. "Durandal" surface penetration bombs on wing and fuselage ALKAN pylons. Two MATRA R 550 "Magic" AAM's are mounted on the wingtips. Of particular interest in this photo are cameras mounted under the nose and on the intake (just ahead of the airbrake) for photographing the "Durandal" (and other weapons) release characteristics.

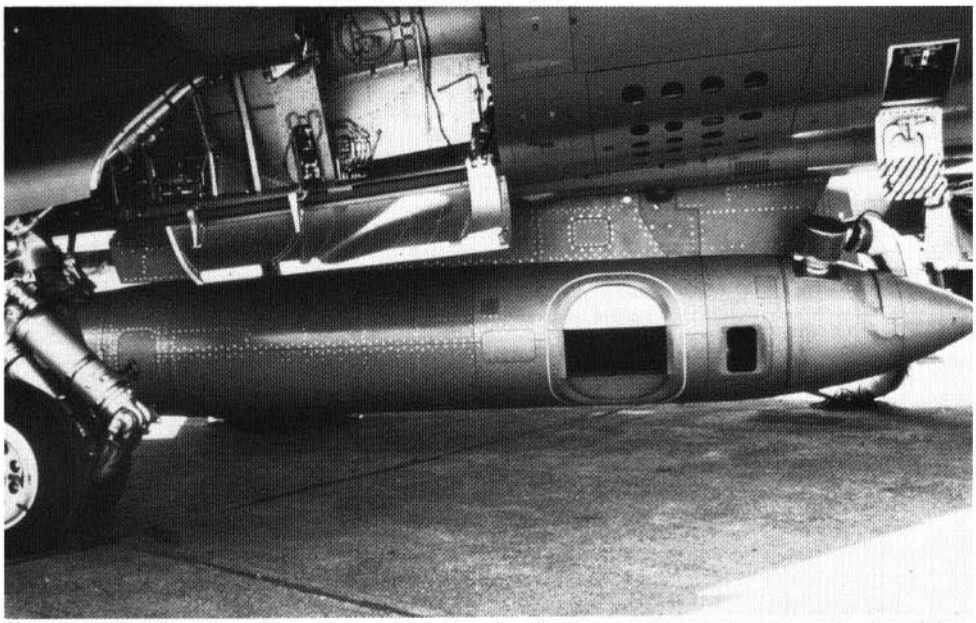
Chris Pocock

"Mirage F1C", 5-NH, of the "Armée de l'Air" poses at a Paris Airshow with a selection of the weapons, ECM pods, fuel tanks, and reconnaissance pods which it is capable of carrying. Of particular interest is the large Thomson-CSF side-looking airborne radar pod in the foreground, and the Thomson CSF DB3163 electronic countermeasures pod mounted on the right inboard wing pylon. Also notable is the reconnaissance pod located near the center of the display.

Alain Pelletier collection

Almost certainly operating at or near its maximum payload capacity, a South African Air Force "Mirage F1CZ" is seen carrying no less than eight 400 kg. (881 lbs.) iron bombs on various ALKAN pylons. Mounted on the wingtips are two MATRA R 550 "Magic" AAM's. The "F1" has been used as a ground support aircraft in actual combat and has proven itself to be well adapted to the role. Note extended flaperons.

René Francillon collection

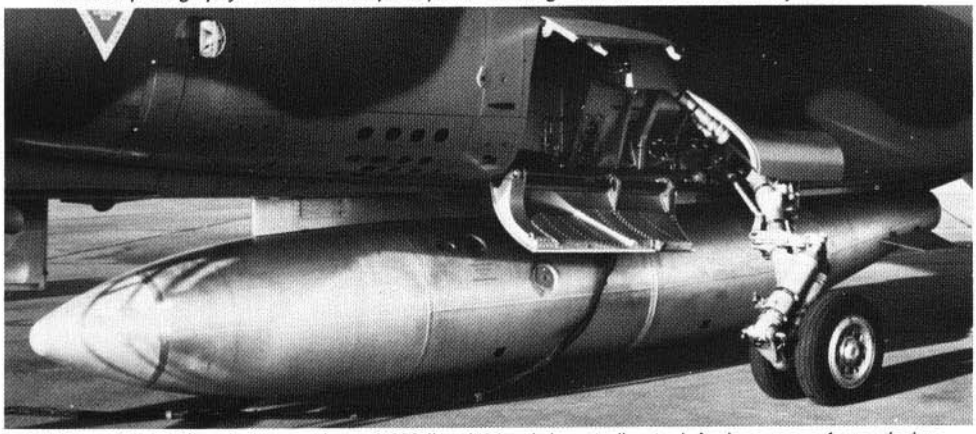


The "Harold" dedicated reconnaissance pod has been developed for use by export customers to expand the "Mirage F1's" mission capabilities. The camera and its rotating lens can be used for conventional or infrared photography. Three camera ports permit coverage of both sides and directly underneath.

René Francillon collection

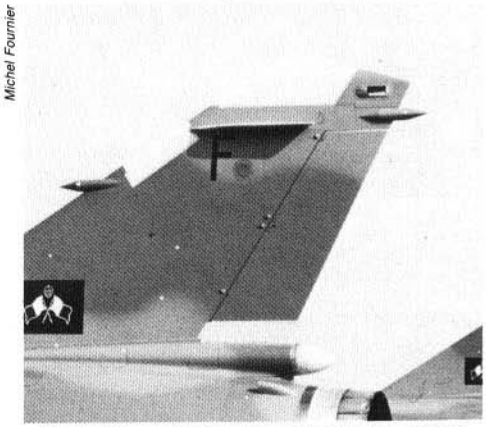
A standard flight suit. Because of the "Mirage F1's" primary air combat mission, a g-suit is virtually mandatory.

René Francillon collection



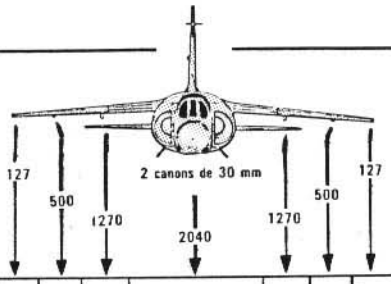
A "Mirage F1EQ-5" with the very large 2,200 liter (581 gals.) centerline tank for long range ferry missions. This tank is rarely seen as its use is limited. As can be seen, ground and main landing gear well door clearances are marginal.

Michel Fournier



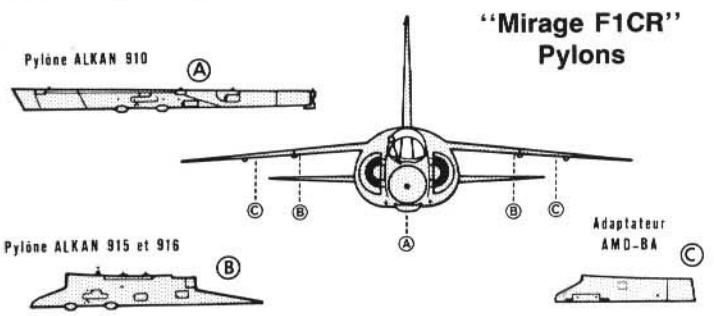
Most "Mirage F1's", such as these "F1EDA's"', are equipped with RHAW receiver antennas on the vertical fin leading and trailing edges.

"Mirage F1C" Weapon Options



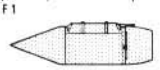
MISSILES AIR-AIR Matra R-530	1							
Matra R-530	2							
Matra 550 "Magic" ou "Sidewinder"	2							
MISSILES AIR-SURFACE Classe des 500 kg	1							
BOMBES Strim 400 kg	8							
227 kg	14							
LANCE-ROQUETTES M 155 (18 × 68 mm) ou F-1 (36 × 68 mm)	4							
ou LR 100 (6 × 100 mm)	2							
BIDONS EXTERNES 1200 litres	3							
PYLONE SOUS FUSELAGE Canons	2							
Conteneur Reco.	1							

"Mirage F1CR" Pylons

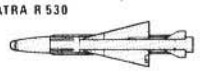


ARMEMENTS

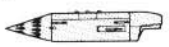
Lance-roquettes (36 de 68 mm)
MATRA F1



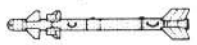
Missile air-air d'interception
MATRA R 530



Lance-roquettes (18 de 68 mm)
MATRA F4

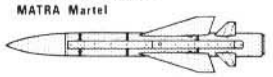


Missile air-air d'interception
MATRA R 550 Magic

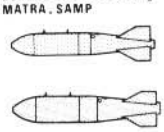


Système lance-grenades (151 de 66 mm)
MATRA-BRANDT Bélouga

Missile air-sol anti-radar
MATRA Martel

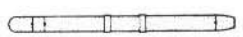


Bombes de 250 et 400 kg
MATRA, SAMP

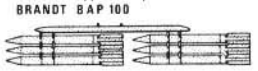


Lance-paillettes d'auto-protection
MATRA Phimat

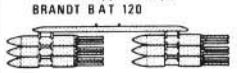
Détecteur-brouilleur de radar
THOMSON-CSF Barracuda



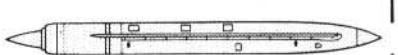
Bombes d'appui tactique
BRANDT BAP 100



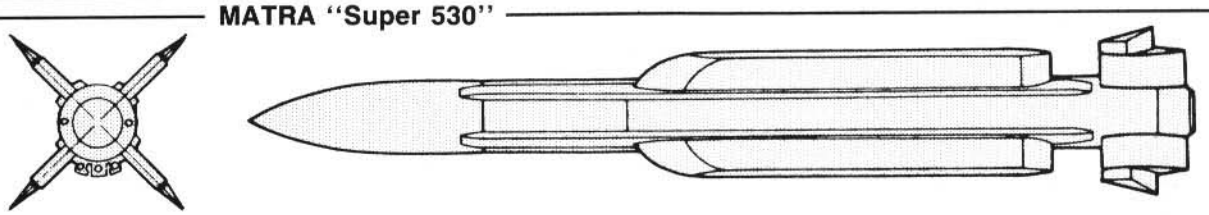
Bombes d'appui tactique
BRANDT BAT 120

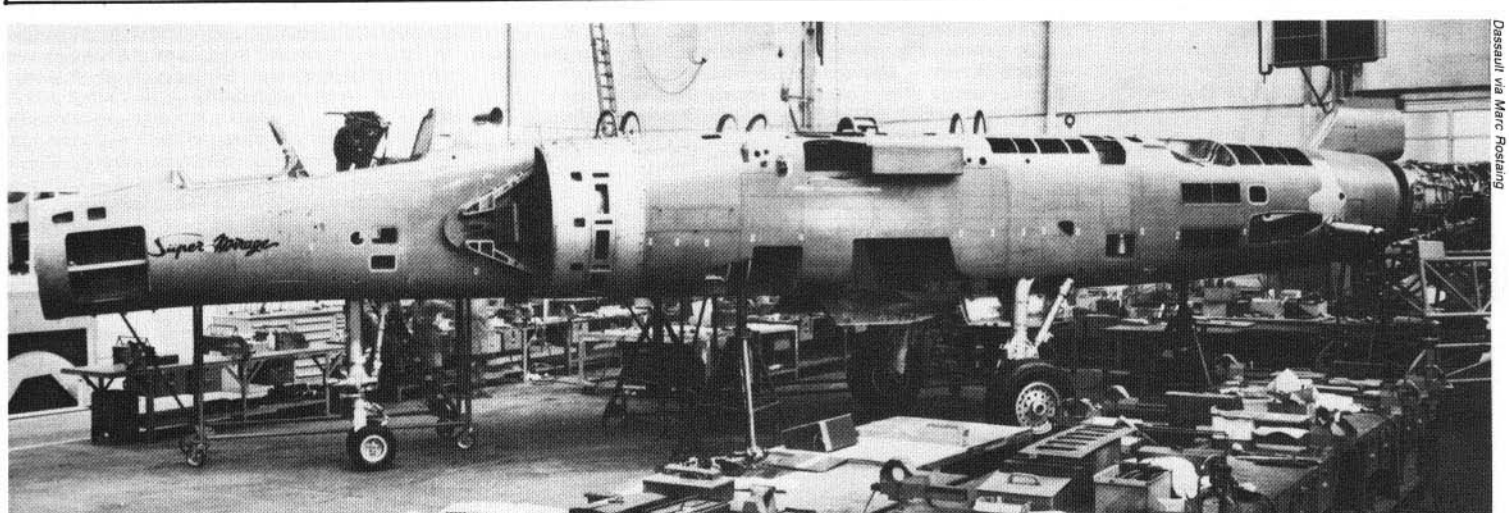


Conteneur de contre-mesures électroniques
THOMSON-CSF CT 51 J



MATRA "Super 530"

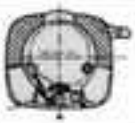




Dassault via Marc Rostaing

Although the "Mirage F1" prototype was briefly known as the "Super Mirage F1", the name "Super Mirage" rightly belonged to a larger aircraft which was to have been powered by two 18,740 lb. th. SNECMA M53 engines. This rare photo shows the "Super Mirage" prototype, which was never completed, under construction at Dassault's St. Cloud facility. Note the exceptionally large intake tunnels, the single wheel main gear, and the slightly drooping nose.

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MINIGRAPH 7: Grumman EA-6A/B
MINIGRAPH 8: Boeing P-26 Variants*
MINIGRAPH 9: North American A3J/A-5 Variants
MINIGRAPH 10: Rockwell International Space Shuttle
MINIGRAPH 11: Lockheed P-3 Variants
MINIGRAPH 12: Saab J-35 Variants
MINIGRAPH 13: McDonnell RF-4 Variants*
MINIGRAPH 14: Lockheed F-94 *Starfire**
MINIGRAPH 15: Republic F-84F (Swept Wing Variants)
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MINIGRAPH 17: Dassault *Mirage* F1*
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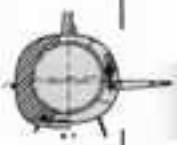
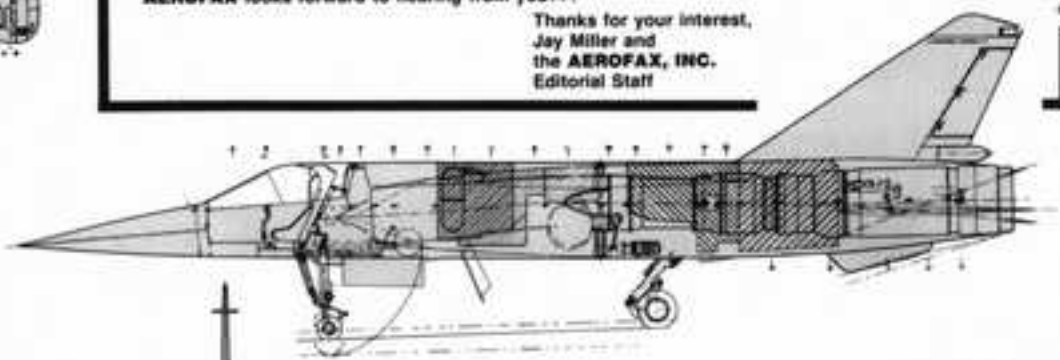
Jay Miller and
the **AEROFAX, INC.**
Editorial Staff

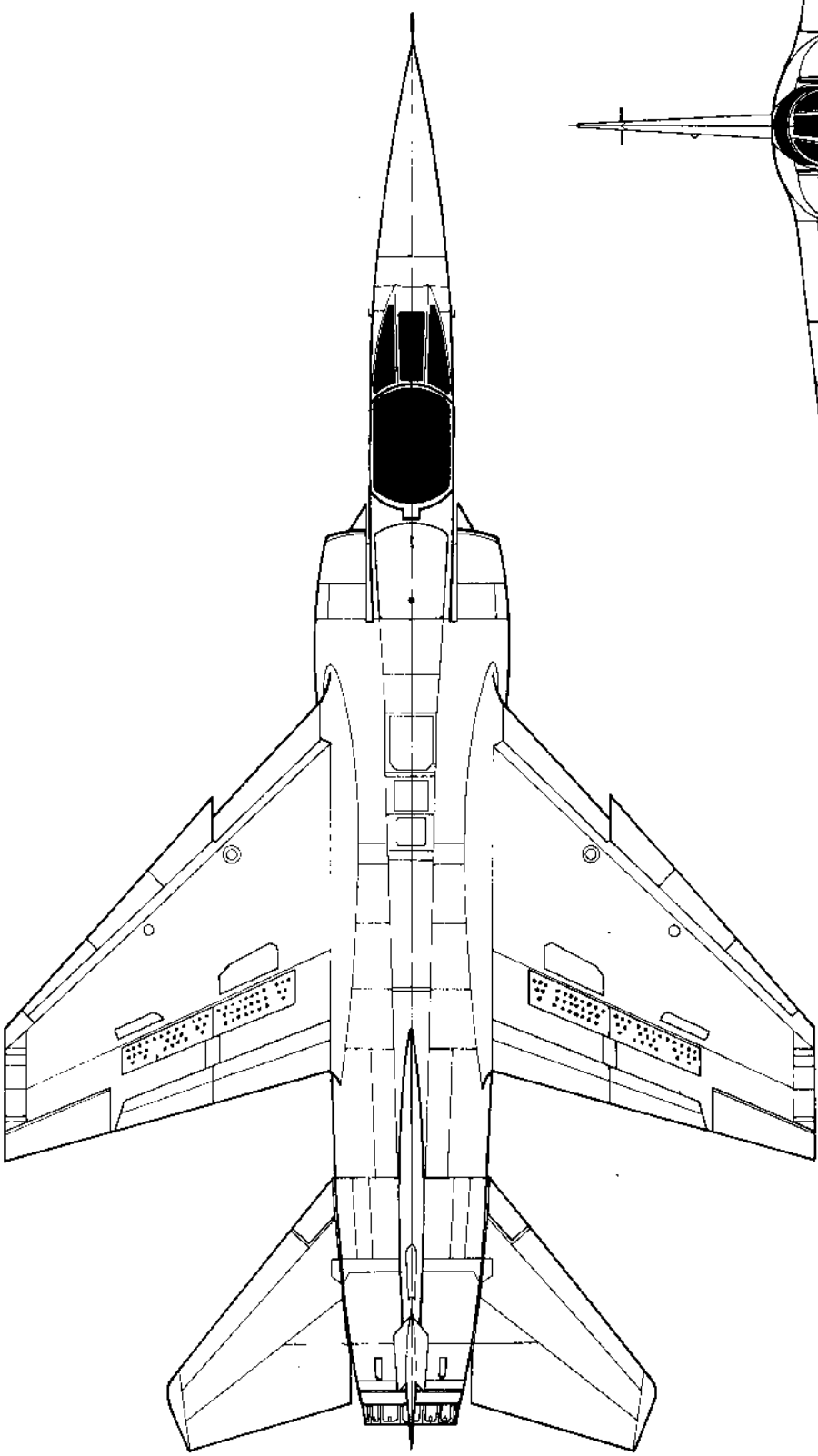


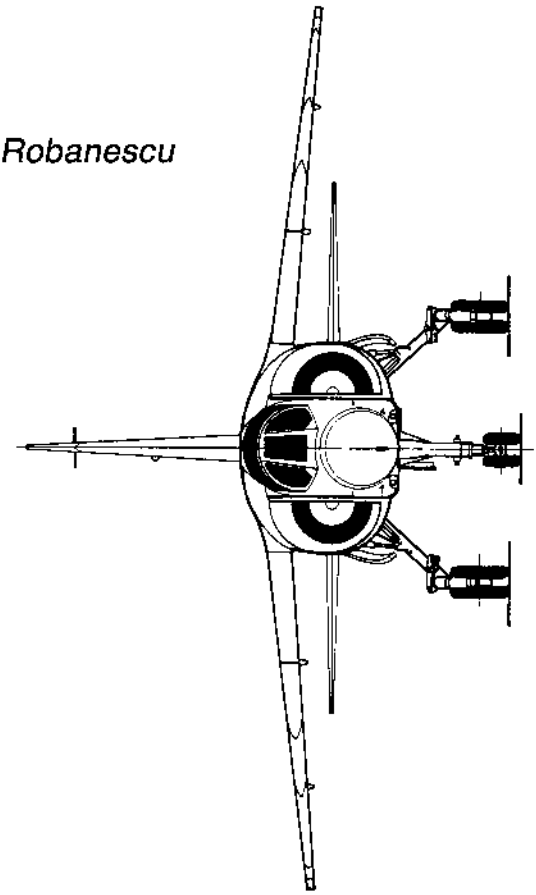




plan au 1/72

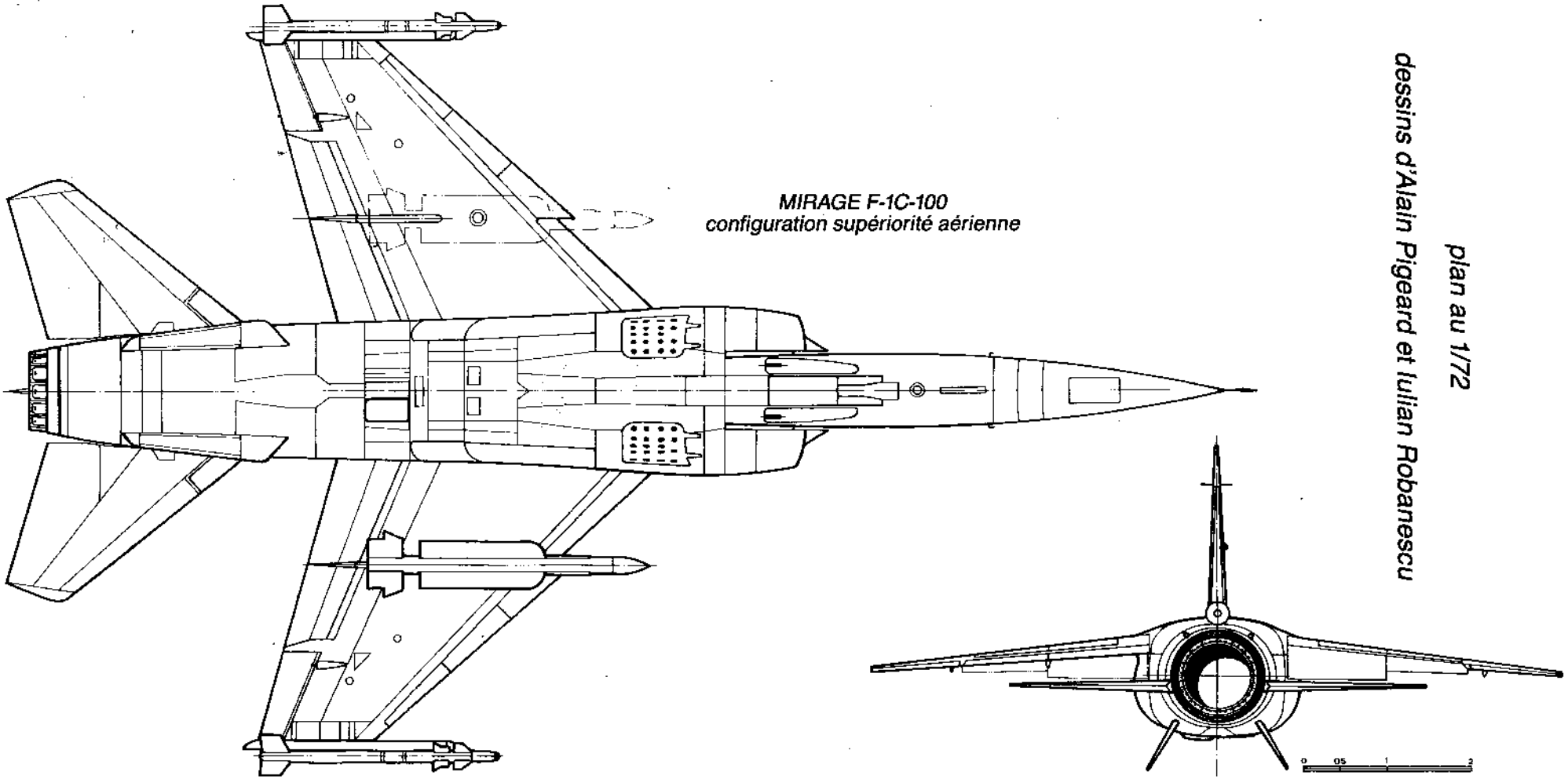
dessins d'Alain Pigeard et Iulian Robanescu





MIRAGE F-1C-100

configuration lisse



MIRAGE F-1C-100
configuration supérieurité aérienne

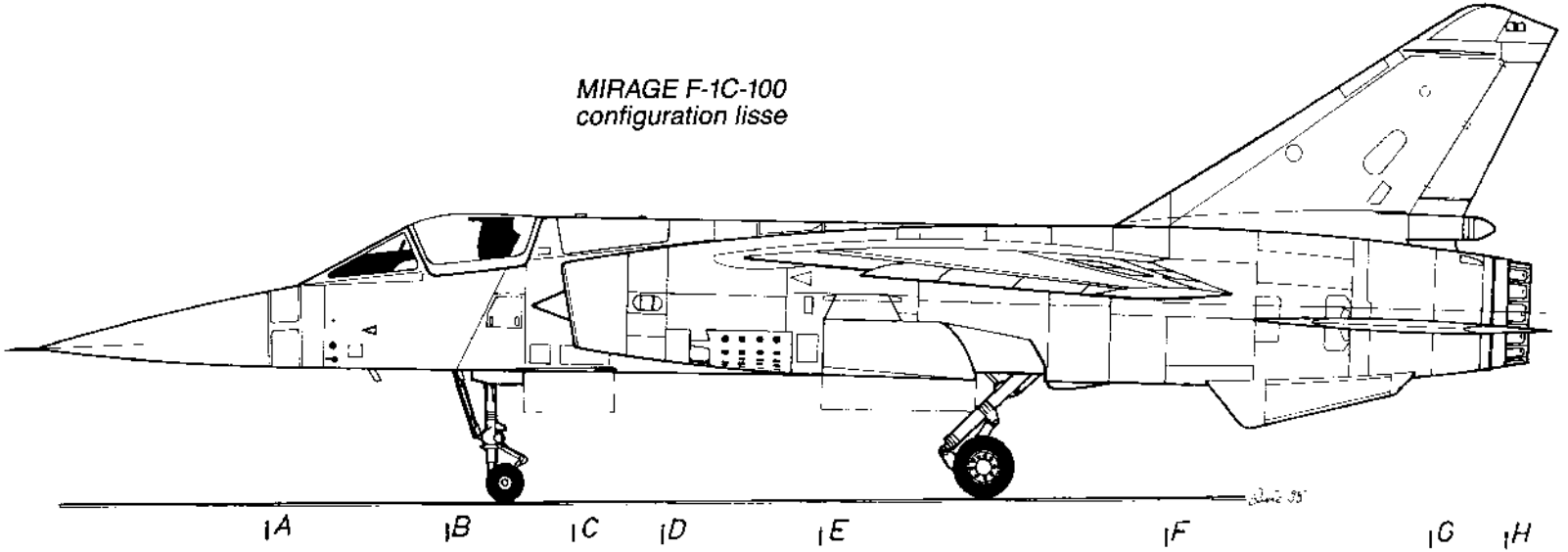
plan au 1/72

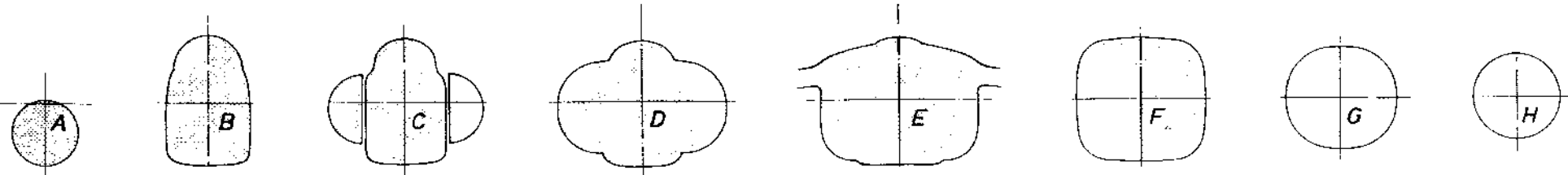
dessins d'Alain Pigeard et Iulian Robanescu

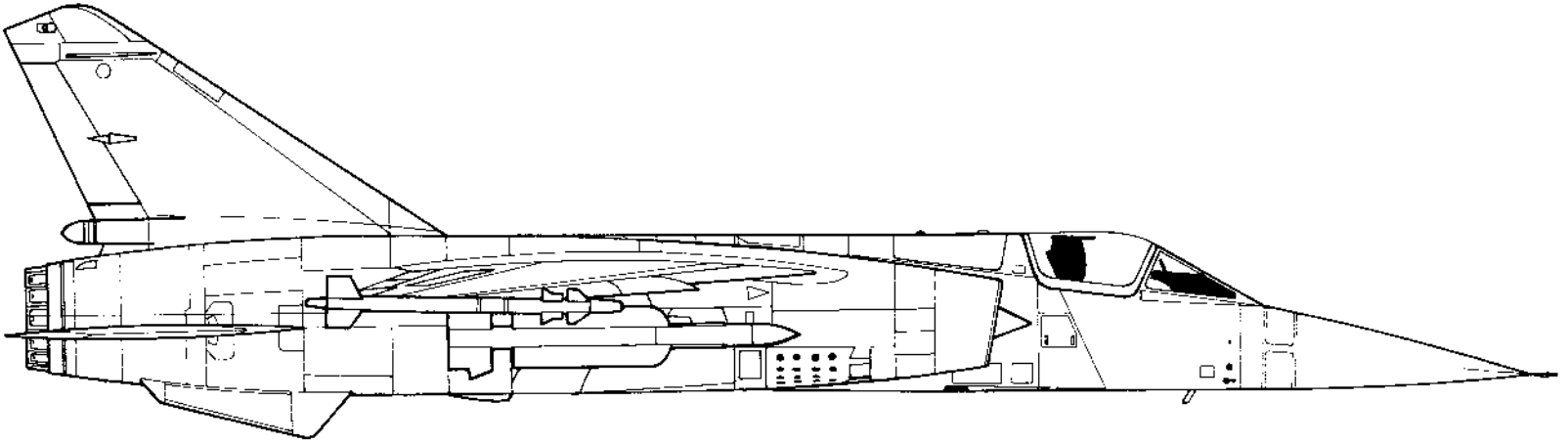
MIRAGE F.1C CARACTÉRISTIQUES ET PERFORMANCES

moteur:	SNECMA Atar 9K50	**rayon d'action avec réservoirs largables et 2000 kg de charge offensive:**	1078 km
envergure:	8,40 m	**rayon d'action sans charge offensive:**	3300 km
longueur:	15,30 m	**poids à vide:**	7400 kg
hauteur:	4,50 m	**poids à charge normale:**	10900 kg
surface alaire:	25,00 m2	**poids maxi:**	16200 kg
poids à vide:	7400 kg	**charge offensive maxi:**	4000 kg
poids maxi:	14900 kg	**armement:**	2 canons DEFA 553 avec 135 coups chacun
vitesse maxi au niveau de la mer:	1471 km/h (Mach 1,2)	**armement ext. mission interception:**	1 ou 2 Matra 530/Super 530
vitesse maxi à 12000 m:	2335 km/h (Mach 2.2)		et 2 Matra 550 Magic ou AIM-9 Sidewinder AAMs
vitesse croisière à 9000 m:	885 km/h	**armement ext. mission d'attaque au sol:**	jusqu'à 4000 kg d'armement
plafond opérationnel:	20000 m		
rayon d'action avec charge offensive maxi:	418 km		

MIRAGE F-1C-100
configuration lisse







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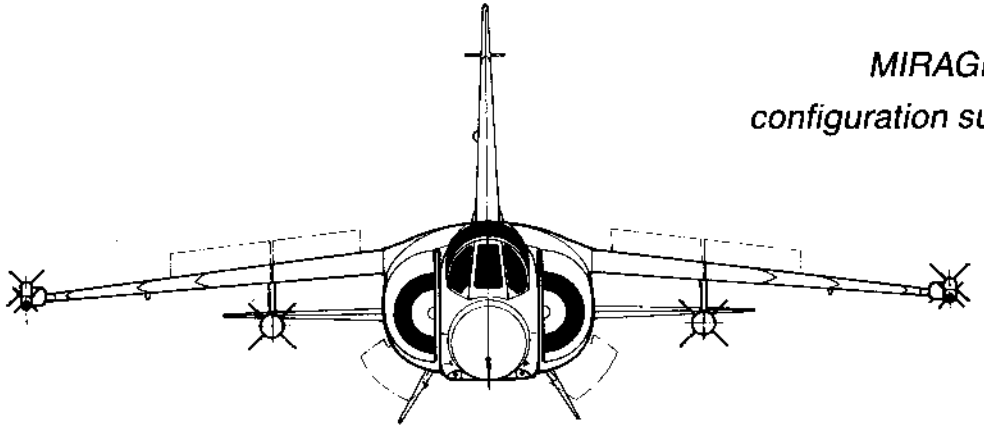
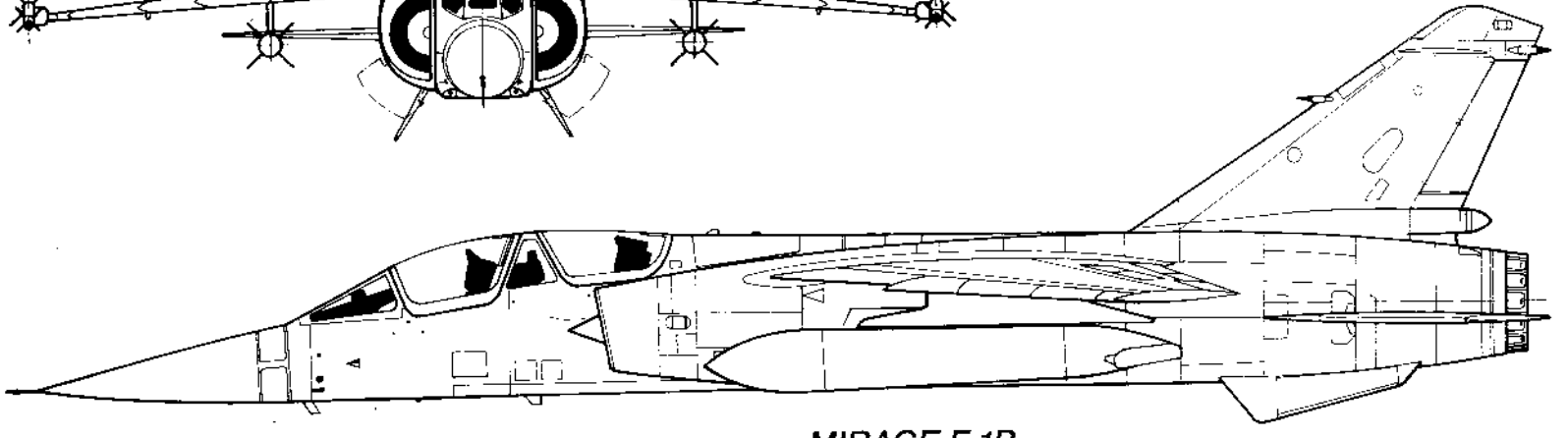
configuration supériorité aérienne





MIRAGE F-1B

avec installation de contre-mesures electroniques et deux bidons